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WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

APRIL 1995 • ISSUE NO. 78
Please display until April 10

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- Candleholders
- Toy dump truck
- Chip-carved box
- Ball picture frame

Storage-Aplenty HALL SEAT

How to SPRAY-FINISH your painted projects.
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We put 22 models to the test.
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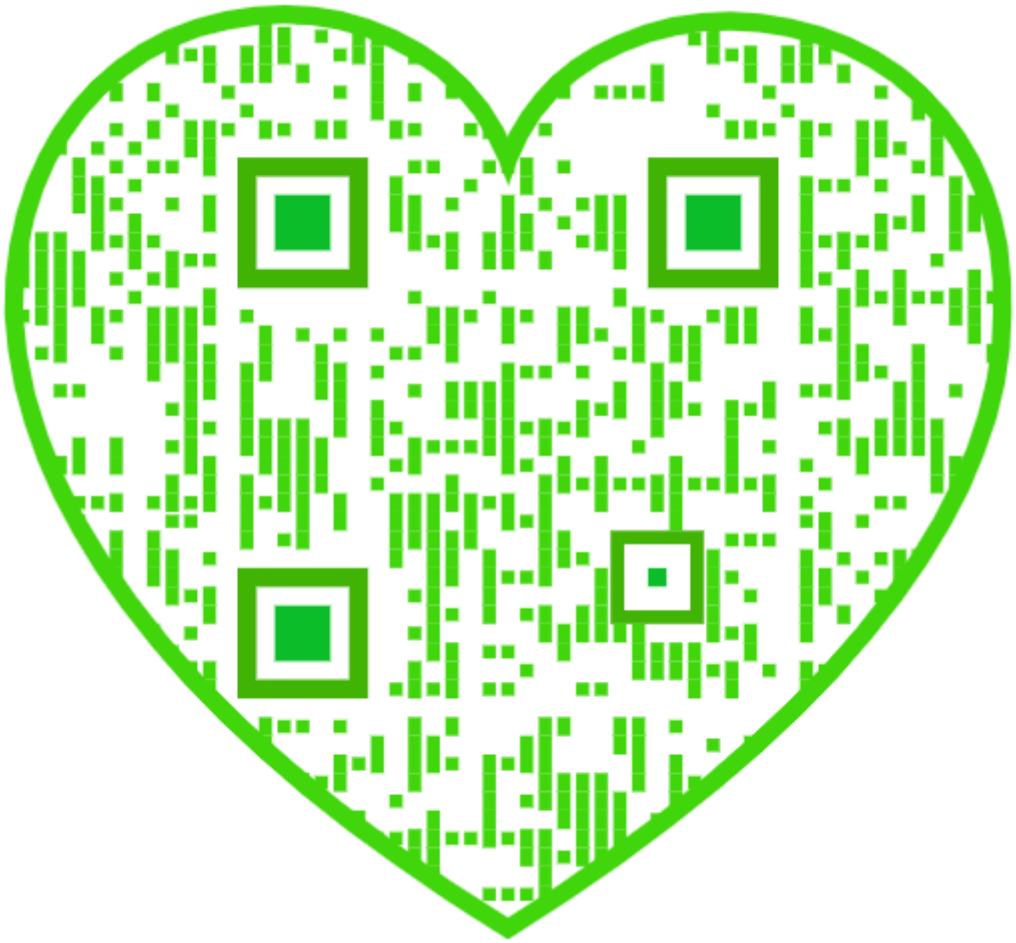

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THE EDITOR'S ANGLE

MY WIFE, THE BEGINNING WOODWORKER

Like most other married couples, my wife Trudy and I pursue our hobbies separately for the most part. She's the mall shopper and crafts-show enthusiast. Me? I usually can be found fishing, hunting, or woodworking.

Over the years we've tried camping, boating, and bowling, to name just a few activities. But usually, things didn't work out for one reason or another. It turns out that she doesn't like bugs much, so camping was ruled out, and riding in a boat made her sick.

But I've noticed for the past several years that she's pretty interested in what goes on in my workshop. First, she suggested that we build some projects together. But I passed on that idea because I thought she'd drive me to distraction with a million questions.

So what did she do? She called her friend Diane, and they built some crafts projects with minimal involvement from yours truly.

Along the way, she's had several mishaps that could have scared her away from woodworking—but didn't. For example, I'll never forget the time she managed to sand off one of her fingerprints with my disc sander. And, she's got to be the world's champ at breaking scrollsaw blades almost immediately after she begins using them. Then there's the day she covered the shop with a film of sawdust because she forgot to turn on the dust-collection system. Like most other people who take up woodworking as one of their hobbies, Trudy has developed a healthy respect for the machinery in the shop, too. She won't go near the motorized mitersaw, for example, because it looks dangerous to her. She prefers to use the bandsaw and the 1" belt sander for her (mostly crafts) projects. And she has learned that respirators, face shields, and pushsticks are an important part of being a safety-conscious woodworker, too.

Trudy taking a break from work on some gumball machines that she's making as gifts for relatives.

What I'm trying to say here is that despite all of my inattention, my wife has discovered the joys of woodworking almost single-handedly. I just wish I had taken her more seriously and showed more patience along the way. But I guess it's never too late to help another person learn more about this great hobby, right?

Larry Clayton

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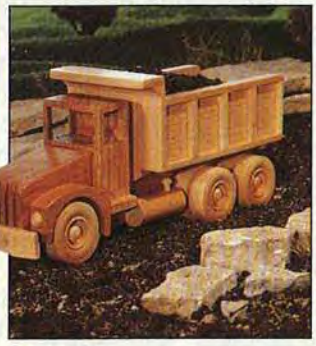

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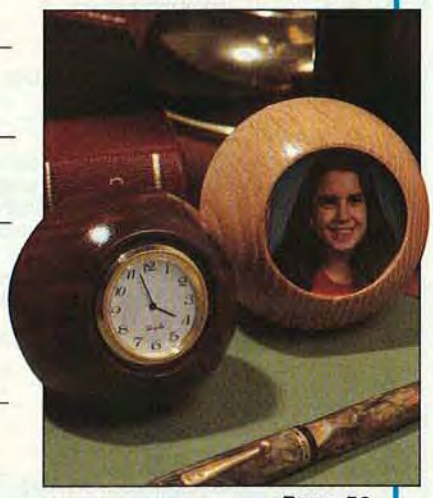

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WOOD DUST AND YOU

It's pervasive, pesky, and polluting, but as a woodworker, you just can't avoid wood dust. Here's some advice on dealing with it.

Face it, if you're active in the shop, you're either going to generate wood dust or stir it up. And dust comes in three forms: coarse sawdust, fine wood dust, and powder. It's all, at the least, irritating, but the powder form—the type you generate by sanding—endangers your health.

Why? Because powdery dust particles actually work their way into your lungs. Continued exposure coats the lungs, and it's then that you can develop health problems, such as emphysema. Woodworkers also face the danger of developing nose cancer (nasal adenocarcinoma) at a rate about 1,000 times greater than nonwoodworkers.

Your best dust defense

Powdery dust remains suspended in the air of your shop for hours. And although you probably like plenty of ventilation, keep in mind that free movement of air into and around the inside of your shop only raises and spreads dust. You can attack that problem, though, with a 110-volt, ceiling-mounted air-filtration unit that corrals fine dust particles from the air, then recirculates the clean air. These units—depending on their power to move volumes of air through your shop—cost anywhere from $300 to $900.

If you decide to buy an air-filtration unit, you'll need to match it to your shop size. To do that, calculate the amount of cubic feet your shop occupies (length × width × height = total cubic feet). Then multiply your shop's total cubic feet by eight—the amount of times per hour that safety experts say the air in your shop should be cleaned (exchanged). Dividing that total by 60 (minutes in an hour) gives you the CFM rating the unit will need for clean air. Here's an example:

Shop size 20×20×8' = 3,200 cu. ft.
Exchanges per hour × 8
Total cubic feet per hour, 25,600
Divided by 60 minutes = 426.6 cubic ft. per minute (CFM rating).

Of course, even with an air-filtration unit you'll want to follow a strategy that reduces the amount of dust that comes in contact with you and your respiratory system. That involves channeling and capturing dust with a dust-collection system directly attached to your stationary power tools. And, when you replace or upgrade portable power tools, such as sanders, buy models equipped with dust-collection bags. While they won't round up all the fine dust and powder, they help.

You also should wear safety goggles and a respirator with a filter designed to trap 99 percent or more of breathable dust. Make sure the mask you pick is approved by the National Institute for Safety and Health (NIOSH), and that it fits snugly against your face to create a tight seal. If you sport a beard that interferes with a tight seal, consider a full-face, helmet-type respirator. Be sure, though, no matter what dust protection you choose to wear, that you keep it on not only during the dust-producing operation, but the rest of the time that you spend in the workshop.

Low-tech dust control

One sure way to get an edge in your battle with dust involves making less of it, or at least less of the finer kind. That means cutting down on sanding. Hand planing, then scraping the workpiece smoothes the wood without producing fine dust. If you're a woodturner, hone your tools to sharp and shear wood rather than scrap it. Sharp saw and jointer blades also mean smoother cuts, with less finish-sanding.

Then, too, there's a proper way to clean your shop to control dust. At the end of each day or period that you work in the shop, pick up the dust that has settled. However, don't do it by dry sweeping or blowing with a compressor hose. That only stirs up the dust again. Instead, use wet mops and damp cloths, followed by a good vacuuming. And be sure to store your collected dust outside the shop in a large bag or sealable drum.

Illustration: Brian Jensen

One Gallon of Water Per Second. Now That's Powerful!

The Craftsman 16 Gallon Vac

It's nice to know you can count on the power of Craftsman wet/dry vacs. With its ability to pick up one gallon of water per second, our 16 gallon vac approaches the power of a fire truck.*

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There are four Craftsman wet/dry vac models to choose from. You can see them all at your Sears store.

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*One 100' length of 1" hose with a nozzle pressure of 50 psi and engine pressure of 125 psi will deliver 68 gallons per minute.

TOOL BUYERS' UPDATE

In our September 1994 review of oscillating spindle sanders, we promised to update you on the performance of the Sears model 22590, which hit the market just as that issue was going to press. In the chart below, we've listed the same criteria used in our first article to help you compare the Sears machine with the models previously tested.

Sears oscillating spindle sander earns a "best-buy"

Having logged a few hours on the new Sears model 22590 oscillating spindle sander, I found it similar to the Ryobi OSS450 we tested in the September 1994 article, but with several key differences.

For starters, the Sears model uses an induction motor with a spindle speed of 1,725 rpm—a bit less aggressive, but much quieter than the 2,000-rpm universal motor on the Ryobi. And induction motors last longer and require less service than universal motors.

Another factor that affects longevity is the drive system. On the Sears sander, an eccentric attached to the motor shaft drives a gear around the inside of a larger, enclosed gear housing. The housing reduces the 1,725 rpm of the gear down to 60 oscillations per minute at the spindle, much like a high-speed egg beater traveling around the rim of a slower-turning cake-mix bowl.

In the bottom of the gear housing, the spindle is connected to a cam follower (a horizontal disk with vertical pins along the rim). The cam follower turns inside a plastic ramp, and as the pins ride up and down in the ramp, the spindle and sanding drum also move up and down.

By comparison, the Ryobi employs a pair of pulleys to drive the spindle and turn a circular ramp which forces the spindle up and down. Over time, the belts on the Ryobi may need replacement, and Ryobi recommends you use one of their factory service centers. The drive mechanism on the Sears sander has no such weak link. In most cases you should be able to service the machine yourself, and spare parts are available through any Sears store.

The Sears machine also impressed me with its ease of use. The big 20×20" table offers a comfortable working height. When hooked up to a 2½" hose, the dust-collection port sucks up about 95 percent of the sawdust generated. And the child-proof removable-key switch is conveniently located on the lower left edge of the base where I can reach it without taking my eyes off the work.

I found only one point to grumble about with the Sears sander—it vibrates more than the other benchtop models. The vibration won't affect your woodworking, but it is annoying.

So what's the bottom line? If price is your main consideration, Sears, at $150, is clearly the best buy of all the models we tested, although the Ryobi OSS450 comes close with prices in the $175 range. If you want to compare performance, you're looking at a choice between a noisy but aggressive Ryobi; or a quieter Sears sander with a durable design, lots of good features, and a little vibration.

—Tested by Dave Henderson

SEARS OSCILLATING SPINDLE SANDER

MODEL	TYPE (1)	HORSEPOWER	SPINDLE (RPM)	STROKES PER MINUTE	SPINDLE DIAMETER (INCHES)	SPINDLE STROKE (INCHES)	SPINDLE LENGTH (INCHES)	DRUM SIZES (DIAMETER-INCHES)	OPTIONAL DRUM SIZES (DIAMETER-INCHES)	STORAGE (YES, NO)	TABLE MATERIAL (2)	TABLE SIZE (INCHES)	PERFORMANCE EVALUATION (3)			OVERALL RATINGS (4)		HEIGHT (TO TABLETOP) (INCHES)	WEIGHT (POUNDS)	WARRANTY	COUNTRY OF ORIGIN	SELLING PRICE
													DUST-COLLECTION	TABLE FLATNESS	SWITCHES	PERFORMANCE	VALUE					
22590	I-ODP	½	1725	60	½	¾	4½	½, 2	¾, 1, 1½, 3	Y	MDF-L	20×20	E	E	E	7	10	11¾	34	1 year	USA	$150

NOTES:

1. (I-ODP) Induction, open drip-proof
2. (MDF-L) Medium-density fiberboard - laminate covered
3. E Excellent, G Good, F Fair, P Poor
4. On a scale from 1-10 with 10 being the highest possible score.

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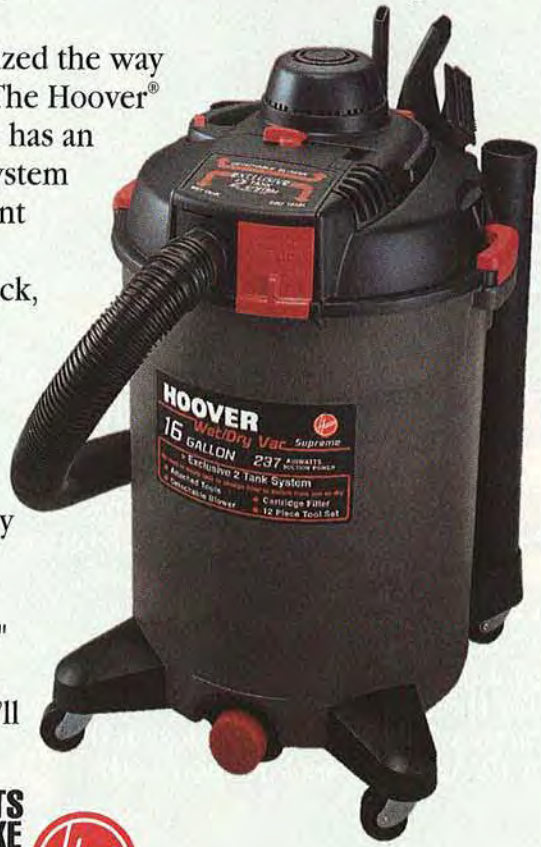

NOBODY GETS THE DIRT LIKE HOOVER. NOBODY.™

Caution: This lathe could be habit forming.

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What woodworkers need to know

HARDWARE FOR HANGING PROJECTS ON WALLS

You've just completed a project that goes on a wall, such as our Federal mirror on *page 63*. The next step is to hang it up. Can you just drive a nail into the wall and be done with it? Maybe, or maybe not. Another method may suit the task better. Here are some of your choices, and how to decide which one to use.

What are you hanging?

First, consider the item you're hanging. Ask these questions:

- How heavy is it?
- Will additional weight be put on it after it's up?
- Will it need to be taken down? Often? Occasionally? Rarely?
- What provision does it have for hanging? There might be a sawtooth hanger, a metal tab with a hole, or, perhaps, a wire strung between a pair of screw eyes. Any of these calls for at least one hook on the wall. It might have a routed keyhole slot, which fits over a screw head, or holes for screwing it to the wall.

Where are you hanging it?

Now, make sure that whatever you're hanging won't interfere with doors, windows, light switches, and the like. Hold the item against the wall when you're checking the location—don't count on memory or measurements to verify whether or not it will fit the spot.

Once you've positioned it, have a helper mark the top and sides on the wall with tiny pencil marks or tape. Next, determine the location of the hanger on back of the project in relation to the top and edges. Then, measuring from the marks on the wall, mark the hanger location on the wall. If the item has multiple hangers, mark them all, making sure they're level.

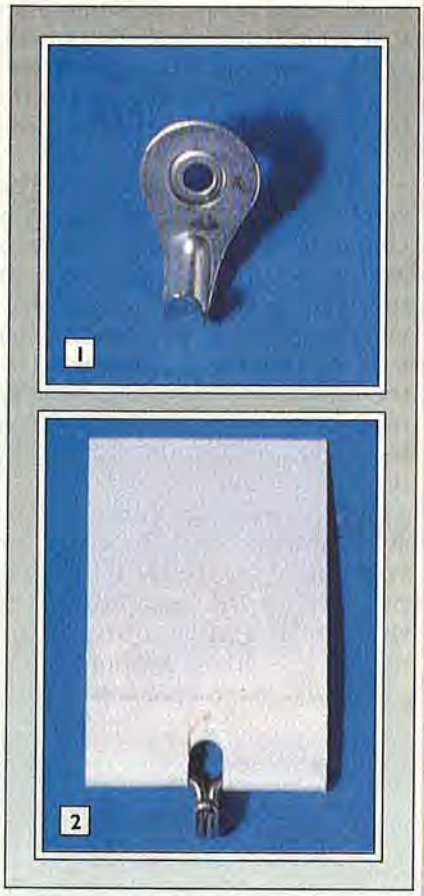
Gypsum-board walls

Wall structure dictates what kind of hardware you can use for hanging. In most cases, you'll be hanging things on a standard stud wall covered with gypsum board or paneling, so that's what we'll focus on.

First, determine whether there's a wall stud behind the spot you've marked. Tap the spot lightly with a hammer handle. If the wall sounds hollow, tap again at several spots to the left and right, listening for the sound to change. When it sounds solid, you've found a stud. (You could test with a stud finder, either electronic or magnetic, too.)

If there's a stud where you've made your mark, or one near enough that you could slightly relocate the item with no difficulty, fall back on that old nail-in-the-wall hanging technique. For anything that will hang on a hook, drive a 4d or 6d finishing nail into the wall at about a 45° downward angle on your mark. Leave about ¼" protruding from the wall, then slip the hanger over it. For a neater job, attach a hook, such as a utility hanger, shown in Photo 1, to the wall with a #8×1" panhead sheet metal screw driven into the stud. Position the bottom of the hook on your mark.

For routed keyhole slots, drive a panhead screw straight into the wall at the mark. Use one about 1½" long, of a diameter to fit the slot in the project. Similarly, drive a through-project mounting screw right into the stud.



If there's no stud nearby, you'll need to use a commercial picture hanger or attach a utility hanger to the wall with an anchor. Check out these choices found at hardware stores or home-centers.

- **Adhesive hanger.** Shown in Photo 2, these work fine for light-duty hanging on smooth walls. The advantage to this type is that you can remove it later without leaving a hole in the wall. (Follow the manufacturer's instructions for removing one; doing it incor-

Continued on page 10

Print this article

What woodworkers need to know

HARDWARE FOR HANGING PROJECTS ON WALLS

rectly may damage the paint or even the paper covering on the wallboard.) Use one of these for a scrollsawed plaque or similar item that weighs less than 10 pounds. Follow the installation instructions carefully, and position the hanger so the bottom of its hook is on your mark.

•**Nail-on picture hanger.** This style, shown *below* in Photo 3, comes in several load capacities. And while it does make a hole in the wall, it is a small one, easily patched if you take the item down later. To install this hanger, place the bottom of the hook over your mark, then hold the back of the hanger flat against the wall as you drive in the nail.

•**Push-in picture hanger**. This style, shown in Photo 4, installs without using tools. Follow the package instructions, starting with the point slightly above your mark. The one shown holds up to 20 lbs in either drywall or paneling. It's easily removed, leaving a small hole in the wall.

For heavier items, attach a utility hanger to the wall with one of these commonly available anchors. Install the anchor far enough above your mark that the bottom of the hanger's hook will be on the mark.

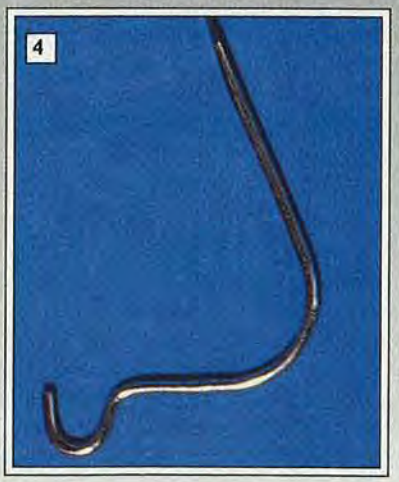
•**Hollow-wall anchor**. The standard hollow-wall anchor, shown in Photo 5, installs easily into a hole drilled through the wallboard. The pointed drive-in type, shown in Photo 6, installs even more easily, since you don't have to drill a hole first. Both hold firmly, but can be difficult to remove from the wall later.

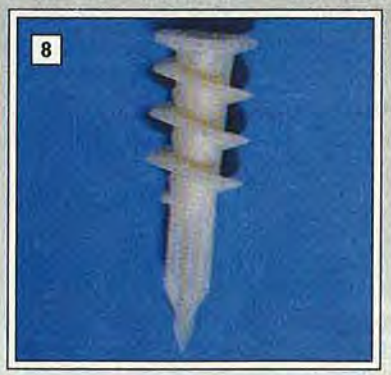
•**Plastic toggle**. Instead of metal, you can use a plastic anchor like the one shown in Photo 7. This one also inserts into a hole drilled through the wallboard. Driving a screw into it draws the wings up against the back of the wallboard. It works best with a sheet metal screw rather than a wood screw.

•**Self-drilling anchor**. A third type of anchor looks like a deeply threaded plastic screw. (You'll sometimes find this style, shown in Photo 8, made of die-cast metal instead of plastic.) Using a Phillips screwdriver or power-driver bit, you just run the anchor right into the wallboard without predrilling. Then, drive a sheet metal screw into the anchor.

To use any of the anchors with a routed keyhole slot, first install the anchor on your mark. Back the screw out of it, leaving a gap between the wall surface and the screw head to accommodate the project slot.

For through-project mounting screws, center the anchor on the mark. Hang the project by driving the screw through the hole into the insert.





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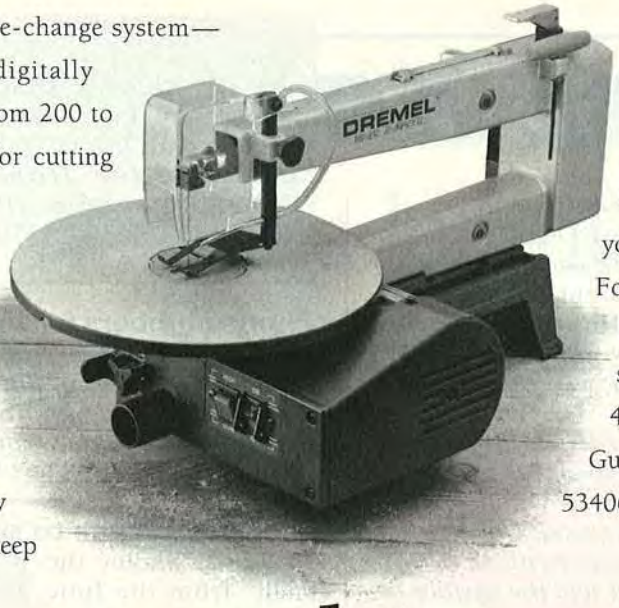

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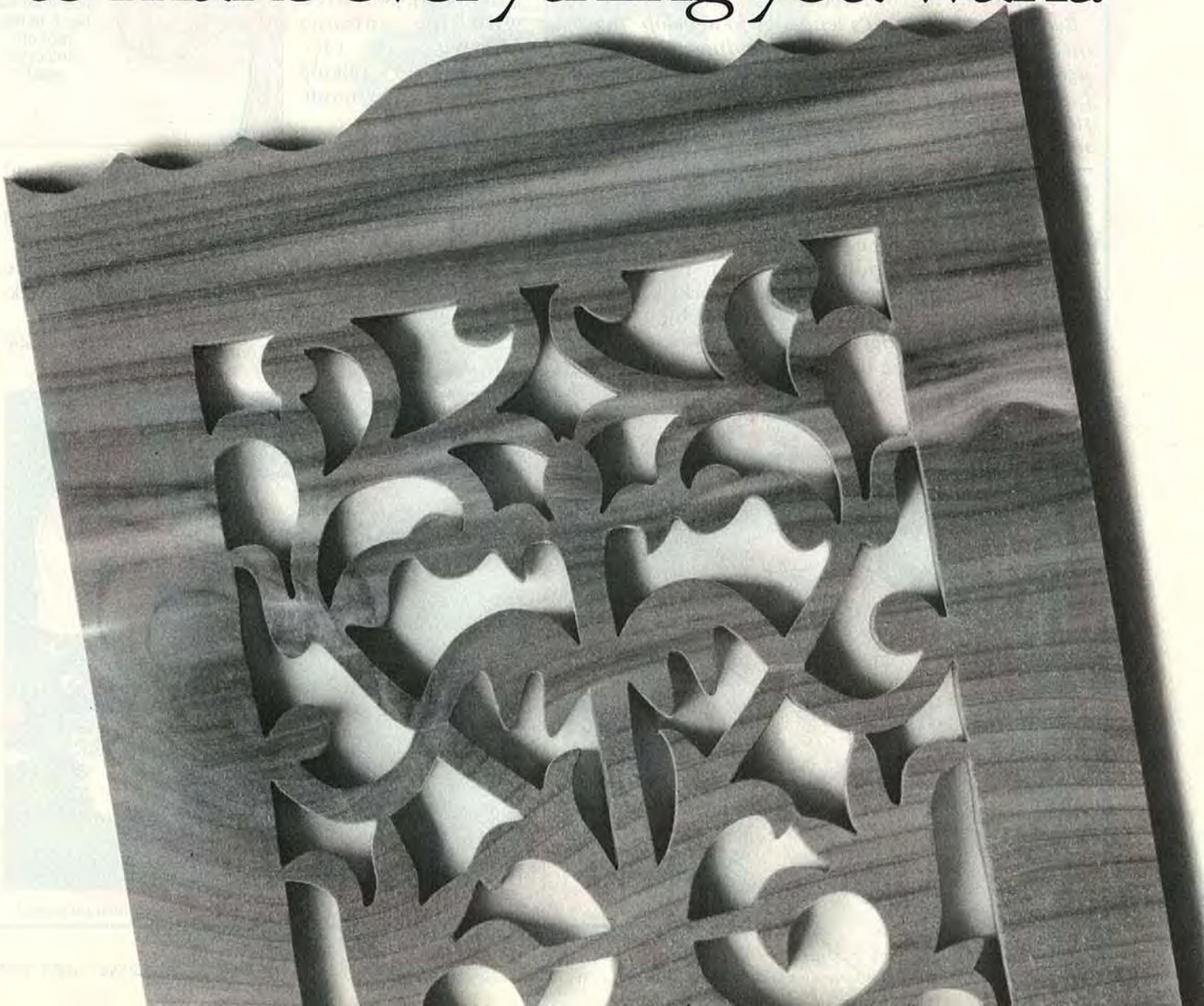


TALKING BACK

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, *Better Homes and Gardens*® *WOOD*® Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379.

A great way to finish butternut

With great interest, I read the *WOOD* Profile on Butternut in the October 1992 issue. I want to work with some of this wood, but I don't know what type of stain to use on it. How would a penetrating oil-type stain and finish work?

James S. Mariner, West Concord, Mass.

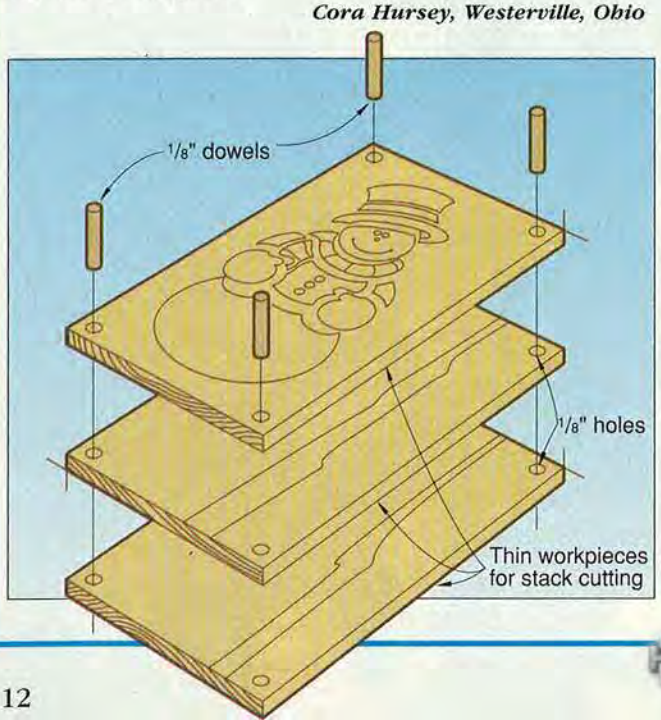
The soft texture and open grain of butternut ensure that it will readily absorb stains and dyes, and a penetrating oil finish such as Watco Danish Oil works well for finishing this wood. Use 600-grit wet-or-dry sandpaper to apply and rub in 3 to 6 coats of oil. This helps to fill and seal the surface as well as to remove any raised "feathers" of grain. If you prefer a penetrating oil finish that contains a stain, use the colored oil on the first two or three coats, again rubbing in the oil with 600-grit sandpaper. Use natural oil, rubbed in with a cloth, for the remaining two or three coats of finish.

Because of butternut's tendency to develop "fuzz" on its surfaces when being machined, we prefer using oil-based stains and finishes to reduce the finishing problems caused by raised grain. We also suggest you test different stains on scraps of butternut to determine which color of stain you prefer.

More on scrollsawing multiple pieces

The Ask *WOOD* article "Tip for Scrollsawing Multiple Pieces" in the September 1994 issue presents a lot of good points. However, I made one change from this direction in my work. I predrill the stack of thin wood with a ⅛" drill bit. Then, I fasten the layers together with ⅛" dowels. This totally eliminates the chance of the nails scratching my scrollsaw table.

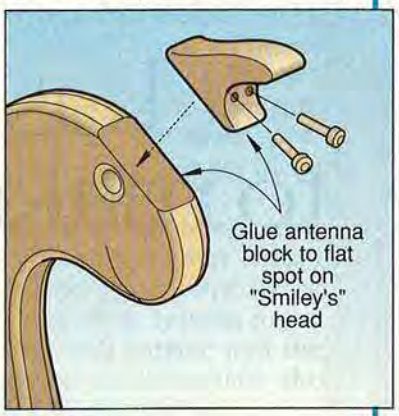
Cora Hursey, Westerville, Ohio



Phone numbers for Integra

We have received several requests from readers for the phone numbers of Integra since our review of its circular saw blade in "Tool Buyer's Update" in the December 1994 issue. You can contact this company by calling: 800/633-6312 or 516/767-2340.

A new approach to snail antenna



I made a "Smiley the Snail" from the June 1993 issue for each of my grandsons (that's Logan and Nathanael enjoying themselves in the photo *below*). Not being satisfied with the antenna change in the October 1993 Talking Back, I further modified the plans.

I made a separate antenna-mounting block (see drawing *above*) and drilled the antenna holes on my drill press. I then disc-sanded a flat area on the snail's head, and glued the antenna block to the snail.

All who have seen these "Smileys" simply rave over them. It appears I will be making more rocking snails when time permits.

—Merle Davis, Larned, Kan.

Continued on page 14

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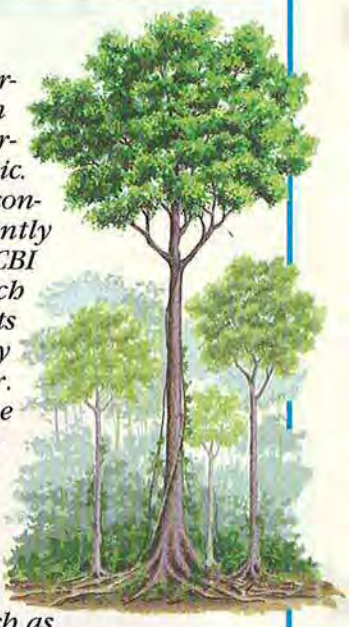
TALKING BACK

Continued from page 12

No shortage of genuine mahogany

I was looking at the June 1993 issue and noticed you suggested using genuine (Honduras) mahogany for the "Fun-in-the-Sun Furniture". I have heard that a lot of clear cutting of the rain forest takes place to harvest one of these trees. I wish you would have used a wood that is more accessible, such as oak or walnut, for the project. I enjoy many of your articles, but I also believe I should act responsibly toward the environment by not using and creating a demand for mahogany wood.

—Julia S. Wuollet, Cokato, Minn.



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Your impression that Honduras mahogany is endangered, and that its harvesting contributes to the destruction of the rain forest is understandable, given the vast amount of misinformation distributed on the topic. To find out more about this controversy ourselves, we recently met with Adam Rouselle of CBI Lumber International, which has exclusive harvesting rights to large tracts of mahogany forests in Honduras. Mr. Rouselle played a videotape showing how his crews selectively cut Honduras mahogany. Strict government regulations prohibit clear cutting, and the timber is removed from the forest by non-mechanized methods such as pack mules. Because of these techniques, Mr. Rouselle considers the current supply of Honduras mahogany inexhaustible.

At WOOD® magazine, we encourage our readers to use all woods responsibly, regardless of species.

Continued on page 16

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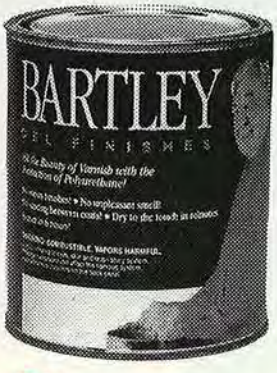

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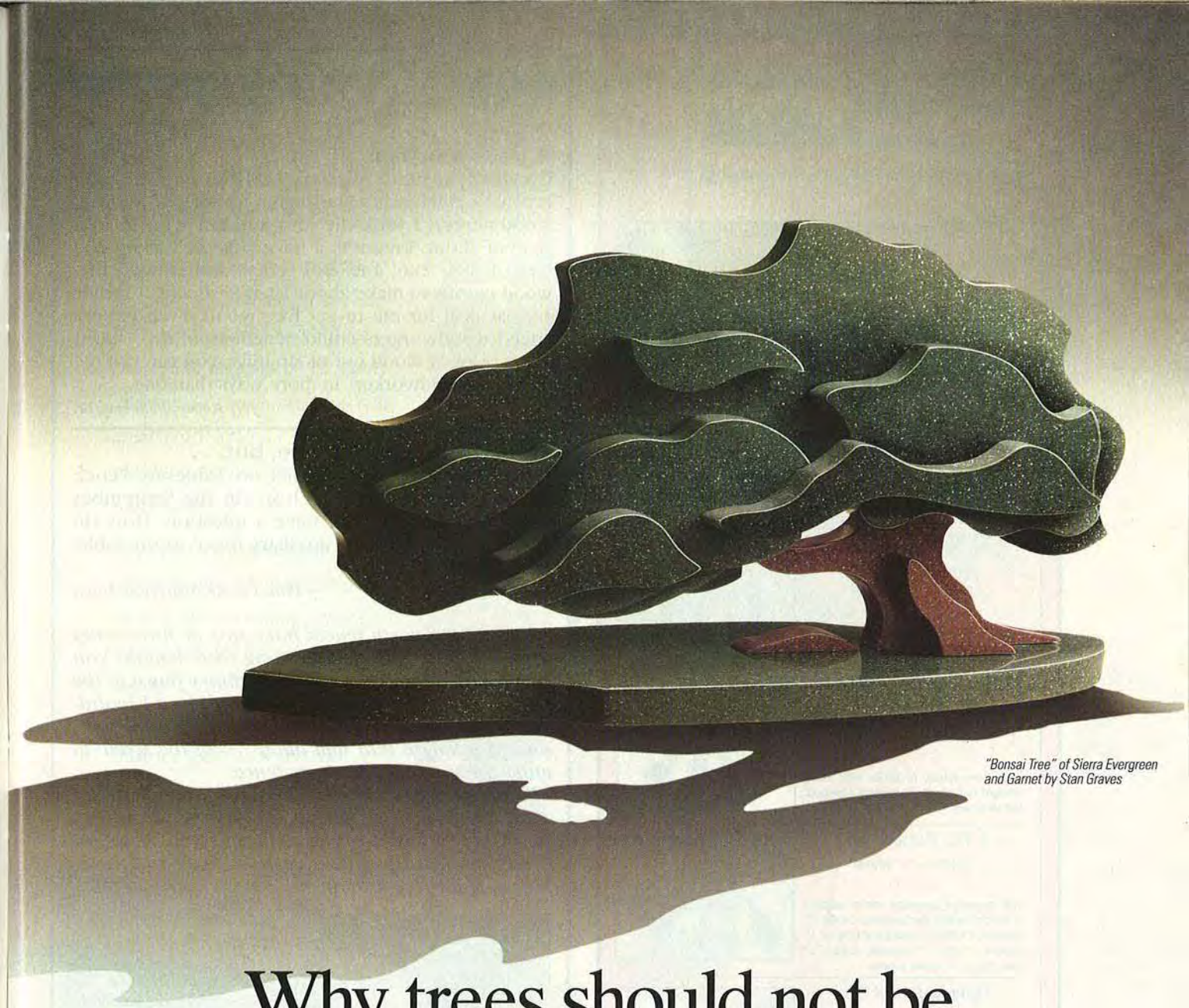

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TALKING BACK

Continued from page 14

A free-wood fan!

I read the article "Waste-Wood Wonders" in the February 1994 issue, and being a poor but aspiring woodworker, I took the idea and ran with it. In a span of about 5 months, I have collected about 200 feet of 2×4, 2×6, and 2×8 scraps and enough plywood cutoffs to make about 10 4×8' sheets. It means a great deal for me to get free wood. Even experienced woodworkers could benefit from this, and it keeps a lot of wood out of landfills. You can call me a "green woodworker" in more ways than one.

Jeff Keller, Bellevue, Ill.

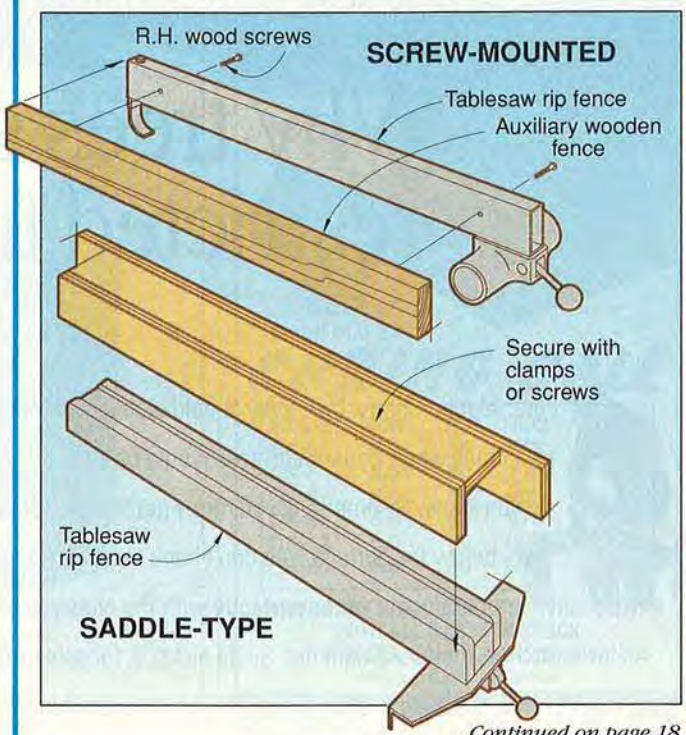
I like the auxiliary fence, but. . .

I liked the Shop Tip "Rabbet on Tablesaw Fence Helps Trim Your Panels Flush" in the September 1994 issue. However, I have a question. How do you fasten the wooden auxiliary fence to the tablesaw rip fence?

—Paul Perrin, Waterloo, Iowa

Many tablesaw rip fences have two or three holes drilled through the fence, along their length. You can use these to fasten your auxiliary fence to the rip fence with screws. Use round-head woodscrews, with a shank slightly smaller than the hole, and of a length that will allow 1/2" of the screw to enter the 3/4"-thick auxiliary fence.

For our readers who use an aftermarket fence on their tablesaw, fastening a plywood auxiliary fence may involve either drilling screw holes, or building a "saddle-type" auxiliary fence to fit over the rip fence (see drawing below*).*



Continued on page 18

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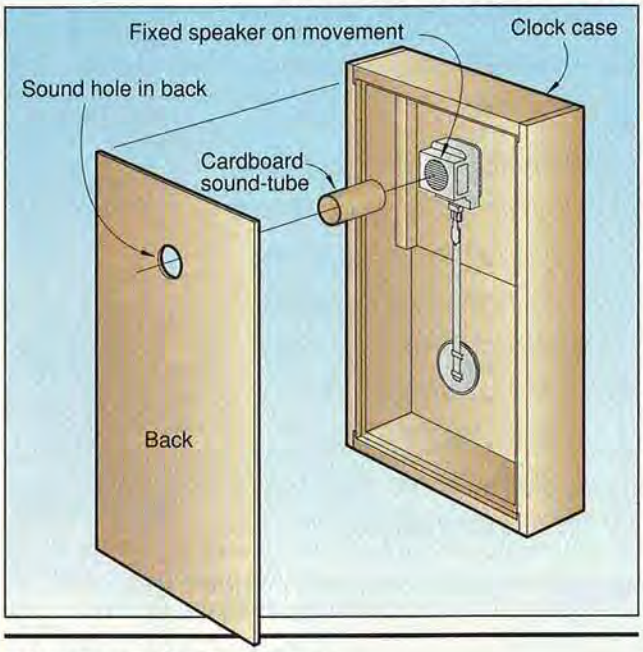
TALKING BACK

Continued from page 16

Cardboard tube makes for a sound idea

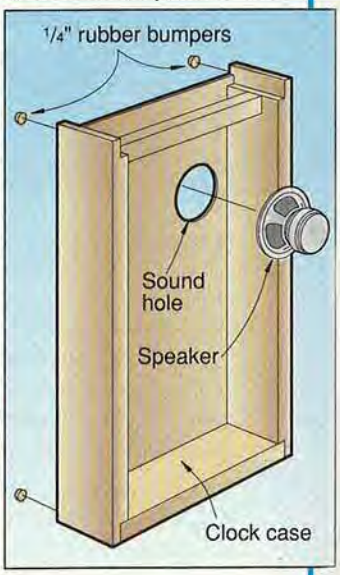
I have another solution for the "Sure cure for muffled chimes" from Talking Back in the August 1994 issue. I have made several clocks using electronic chime movements. These movements did not have a detachable speaker, and even with a sound hole, the chimes were muffled. I used part of a wrapping-paper cardboard tube as a sound tunnel between the chime speaker and the soundhole in the clock case. This arrangement greatly clarified the sound of the clock chimes.

—Howard McCoy, West Monroe, La.



More on clock chimes

I read the Talking Back article entitled "Sure cure for muffled chimes" in the August 1994 issue with interest. I build wall clocks as a hobby, and use both mechanical and electronic chime clock movements in my cases. To obtain a clear sound from the chimes, I mount the speaker over a hole in the back of the clock, and place rubber bumpers on the case to hold the clock slightly off the wall. This provides for good sound, and is not as noticeable as a grill mounted to the side of the clock. I obtain the bumpers, either adhesive-backed or fastened to a brad, from my local hardware store.



—E.J. Mossman, Kankakee, Ill.

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Smart buys in CLEAR SPRAY FINISHES

Print this article

To quickly and conveniently apply a smooth, hard coating to projects, we often turn to aerosol finishes. But after relying on the same brand for years in the *WOOD*® magazine shop, we wondered if we were using the best product available. So, we went on a shopping spree, rounded up every clear aerosol finish we could find, and put them through side-by-side tests. Here's what we discovered.

First, a few words about our tests

As you can see in the chart *right*, our product sampling includes polyurethanes, urethanes, lacquers, enamels, acrylics, and a varnish. Some products don't fit neatly into any of these familiar descriptions and go simply by titles such as "clear finish." In our search we also found one water-based finish—Flecto's Varathane Elite Diamond Finish IPN Coating.

As we expected, the polyurethanes and urethanes cured slowly to a thick, durable finish. The lacquer-based products dried quickly and proved more susceptible to damage from water and alcohol. Most of the other finishes fell somewhere between these extremes. We also tested the finishes for resistance to running, coverage, finish quality on three species of wood, and their degree of amber tint. You'll find these results, and more, in the chart.

What to consider before choosing an aerosol finish

It makes a lot of sense to use an aerosol finish if you're in a hurry or working on a small project that doesn't require more than a can or two to complete. Also, these products help you achieve a smooth, sprayed-on finish without investing in a spray gun that runs off a turbine or air compressor. But, carefully weigh these other considerations before reaching for a spray can:

- ***Overspray.*** Like any high-pressure spraying system, aerosol finishes produce a lot of overspray (finish particles that wind up in the air and on surrounding surfaces rather than on your project). So, you can use them only in extremely well-ventilated areas.
- ***Cost.*** Ounce for ounce, aerosols are the most expensive way to apply a finish. And, because aerosol products contain a high proportion of reducers (thinning agents) to make the finish flow from the can without clogging or sputtering, you need to apply more coats to cover a surface than with brush-on finishes.

Recommendations

We prefer aerosol finishes for no-fuss, no-mess finishing of small projects. But, if you build larger projects such as cabinets or furniture, or produce small items in quantity, it pays to invest in a spraying system like those on *pages 46-51.* If you only occasionally finish large pieces, it often makes sense to brush on your first two coats, then spray on an aerosol final coat.

For projects with vertical surfaces, we recommend that you use an aerosol with a fan (vertical ellipse) spray pattern. We experienced more-even coverage and fewer sags and runs with fan-pattern spray nozzles.

Of the products tested for this article, four of them particularly impressed us:

- *Rust-Oleum Clear Finish* proved itself the best overall finish. It builds and levels like a high-quality paint, dries reasonably fast, and has a modest price tag.
- The best values were the *Ace Premium Enamel* and *Dutch Boy Fresh Look Acrylic Enamel.*
- Few finishes top a polyurethane for toughness, and the *Glidden Woodmaster Polyurethane* performed as well as any of them and comes reasonably priced.

SIDE-BY-SIDE COMPARISON OF 21 CLEAR AEROSOL FINISHES

MANUFACTURER/IMPORTER	SPRAY PATTERN (1)	DRYING TIMES: BETWEEN COATS (2) (HOURS:MINUTES)	DRYING TIMES: DRY TO TOUCH (3) (HOURS:MINUTES)	RESISTANCE TO (4): WATER (5)	RESISTANCE TO (4): ALCOHOL (5)	RESISTANCE TO (4): RUNNING	COVERAGE (6)	FINISH QUALITY ON SPECIFIC WOODS (4): MAPLE (6)	FINISH QUALITY ON SPECIFIC WOODS (4): OAK (6)	FINISH QUALITY ON SPECIFIC WOODS (4): PINE (6)	AMBER TINT (7)	QUANTITY (OUNCES)	STREET PRICE (8)	COMMENTS
ACE INSTANT DRYING LACQUER	R	0:10	0:40	G	E	E	F	F	G	F	1	11	$3.99	Like other lacquers in test, this product did not hold up well against water.
ACE PREMIUM ENAMEL	R	0:10	0:40	E	E	E	E	G	G	G	1	11.5	2.89	Good performance with a nice price tag.
DEFT CLEAR WOOD FINISH	F	0:30	0:40	G	G	F	G	G	G	G	1	12.25	4.99	A tad expensive compared to other lacquer finishes.
DEFTHANE POLYURETHANE	F	6:00	6:00	E	G	E	E	E	E	G	3	11.5	5.49	Like other polyurethanes in test, this product dries slow but forms a thick, durable finish.
DUTCH BOY FRESH LOOK ACRYLIC ENAMEL	F	0:10	0:40	E	E	E	G	G	G	G	1	12	1.89	A bargain at this price. We bought our sample at K-Mart.
DUTCH BOY FRESH LOOK LACQUER SPRAY	F	0:10	0:40	G	E	E	F	F	G	F	1	11	3.67	Lowest price of the lacquer finishes.
FLECTO VARATHANE ELITE DIAMOND FINISH IPN COATING	F	0:15	1:00	G	G	E	G	G	G	G	1	11.25	7.99	The only water-based finish in test. Very clear. Tends to run on vertical surfaces.
FLECTO VARATHANE LIQUID PLASTIC	F	0:20	1:00	E	E	E	G	G	F	F	2	11.25	6.99	The brush-on version of this product came out on top of our comparison of oil-based polyurethanes in the October 1994 issue.
FLECTO VARATHANE PROFESSIONAL CLEAR FINISH	F	0:20	1:00	E	E	F	G	G	G	G	2	11.25	6.99	For a polyurethane, it dries to the touch relatively quickly.
GLIDDEN WOODMASTER POLYURETHANE	F	0:15	3:00	E	E	E	E	E	E	G	3	11	3.79	Performed as well as any of the polyurethanes, with the lowest price of this group.
KRYLON CRYSTAL CLEAR ACRYLIC COATING	R	0:10	0:15	G	G	E	G	G	G	F	1	11	3.69	Fast dry time and little amber tint. Best results obtained with hardwoods.
KRYLON POLYURETHANE	R	0:10	1:00	E	G	F	G	G	G	G	2	11	3.99	Fast drying and inexpensive as polyurethanes go.
KRYLON SPRAY VARNISH	R	0:05	1:00	G	G	E	G	G	G	F	1	11	3.47	Extremely fast dry time between coats.
MINWAX FAST-DRYING POLYURETHANE	F	0:15	4:00	E	E	E	G	G	G	G	2	11.5	4.99	The brush-on version of this product is a favorite of *WOOD* magazine staffers.
MINWAX HELMSMAN SPAR URETHANE	F	0:20	4:00	E	G	E	E	G	E	G	3	11.5	4.99	A good choice for projects subjected to water.
PARKS HARD-TO-RESIST POLYURETHANE	F	0:10	24:00	G	G	E	F	G	G	F	4	11	3.97	Slowest-drying, and darkest amber cast, of tested products. Inexpensive.
RUST-OLEUM CLEAR FINISH	R	0:15	4:00	E	E	E	E	E	E	E	2	12	3.99	A top performer that fills grain and levels out quite well. Similar to Rust-Oleum Stops Rust paint without pigment.
TRU-TEST HI-Q ENAMEL	R	0:15	0:45	E	G	E	G	F	G	F	1	11.9	2.88	Nearly the same results as Tru-Test lacquer for $1 less.
TRU-TEST HI-Q LACQUER	R	0:15	0:45	G	G	E	F	F	G	F	1	11.9	3.98	Similar to other tested lacquer finishes.
WOOD KOTE FLAGSHIP MARINE FINISH POLYURETHANE	F	0:20	4:00	E	E	E	E	E	E	G	2	11.5	5.99	An excellent-performing finish that holds up to elements better than other clear finishes.
ZIP-GUARD URETHANE WOOD FINISH	F	0:30	3:00	E	E	E	E	E	E	G	2	12	4.99	Excellent performance. A tough, durable finish.

NOTES:

1. (F) Fan (vertical ellipse) (R) Round
2. According to manufacturer
3. At 72°F and 50% humidity
4. E Excellent; G Good; F Fair; P Poor
5. Water drop left on surface for 30 minutes. Alcohol drop left on surface for 10 minutes.
   - E No penetration into surface of finish.
   - G Minor penetration mark that was removed with polishing.
6. E Finish fills grain pores, leaving a smooth, level finish.
   - G Smooth, even finish, but grain pores not filled.
   - F Grain pores absorb finish unevenly, leaving dull spots.
7. Rated on a 1 to 4 scale with 1 being a finish with no or little amber tint, and 4 being a finish that leaves a dark amber tint.
8. Prices we paid at local merchants. Prices may vary from region to region and store to store.

Written by Bill Krier Technical consultant: Bob McFarlin Photograph: John Hetherington

TIPS FROM YOUR SHOP (AND OURS)

A stopped dado makes a clean joint for book shelves and other projects, and it doesn't take much time to rout the dadoes. But cutting the notches for each shelf seems to take forever.

The solution? You can knock out these notches in no time if you spend just a few minutes making a template like the one Ray Brown Jr. shared with us at *right*. Ray's template guarantees accurate results, and we liked his idea so well that we awarded him the prize for the top shop tip of the issue.

Most woodworkers appreciate learning new methods and shortcuts, and that's what Tips From Your Shop (and Ours) is all about. The next time you come up with a great shop tip, send us a letter with a brief explanation and a drawing or photo to:

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If we publish your tip, we'll pay you $40, plus you get a shot at winning a new tool for the top shop tip. We try to avoid tips that have appeared in other magazines, so please send yours to only one. Also note that we cannot return submissions. Thanks, and keep sending those tips.

Tom Jackson
General Interest Editor

Template and router make quick work of shelf notch

Notching a shelf to fit tightly into a stopped dado sure takes a lot of time. Isn't there a quicker way?

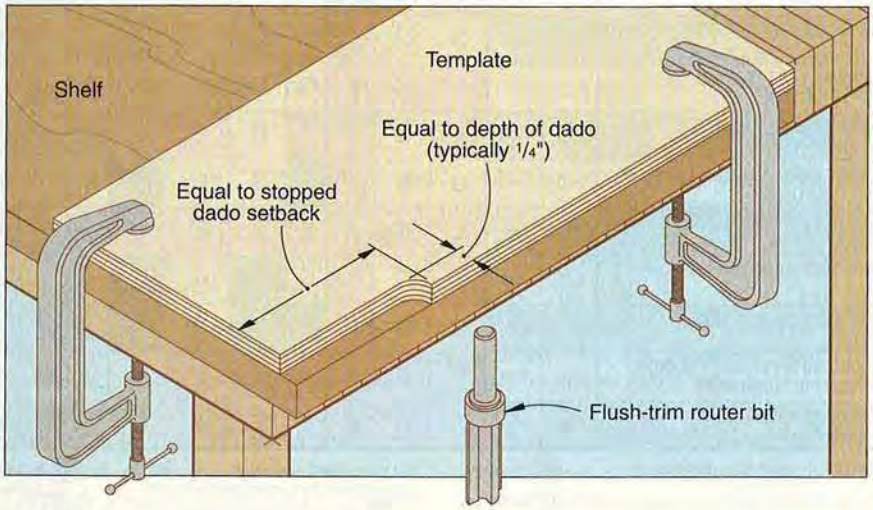
TIP: You can cut notches quickly and accurately with this simple template and a flush-trim router bit. Cut the template from ½" Baltic birch plywood or any other high-quality hardwood plywood without voids. Make it as long as the width of the shelf and wide enough so that you can rout the notch without the router baseplate bumping into the clamp (usually about 4"). Next, cut the notch in the template. Size the width of the notch as deep as your stopped dado and the length to match the dado setback.

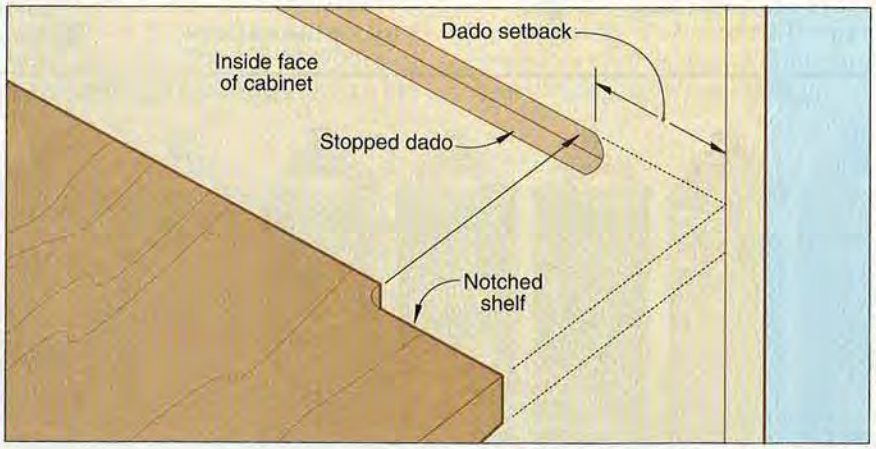
For submitting the top shop tip in this issue, Ray will receive a Sears Excalibur Elite 8" Precision Adjustable Dado set.

TOP SHOP TIP

Now, align the side and front edges of the template with the edges of the shelf, and clamp the template as shown. Chuck a flush-trim bit into your router and rout your notch. Reposition the template on the other end of the shelf, and rout again.

—Ray Brown Jr., Boulder City, Nev.





Continued on page 24

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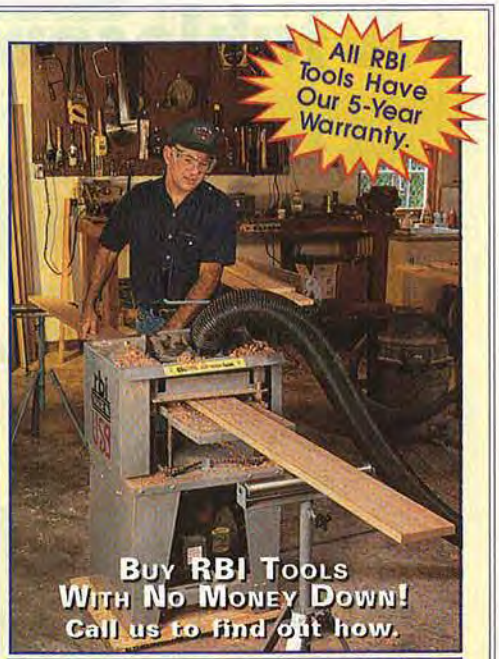

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Circle No. 84

TIPS FROM YOUR SHOP (AND OURS)

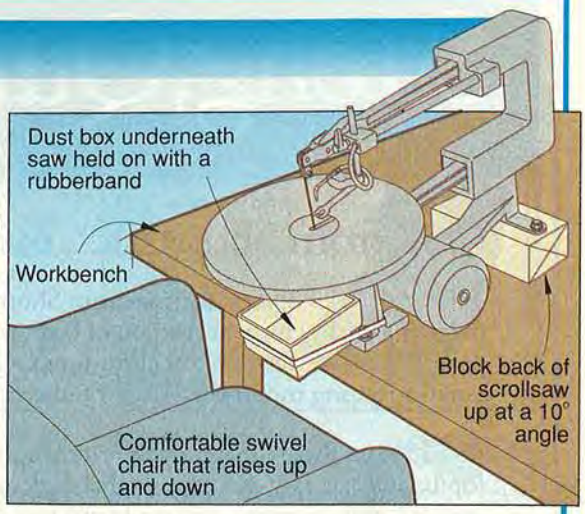
Continued from page 22

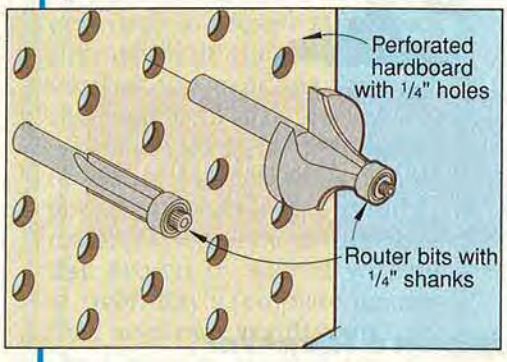
A swivel chair and tilted scrollsaw equal less fatigue

Many people love to scrollsaw for hours at a time. But hunching over a saw for that long can give you a stiff neck and shoulders.

TIP: Set up your scrollsaw work station for comfort. First, get a swivel chair and raise it higher than you normally sit. Then, tip the back of your scrollsaw up with a block of wood so that the saw sits at about a 10° angle. (Be sure to bolt the saw to the block and the block to your table or bench.) In this position, you won't need to lean over the saw to work, and your muscles and joints will thank you for it. You can also attach a dust-collection box below the table to make cleanup easier.

—Allen Salfer, Atlantic Beach, Fla.


Dust box underneath saw held on with a rubberband
Workbench
Block back of scrollsaw up at a 10° angle
Comfortable swivel chair that raises up and down



Store router bits on perforated hardboard

When using multiple router bits to create fancy profiles, the bits tend to clutter up your work area unless you take the time to put them back in a case or holder.

TIP: If you're using router bits with ¼" shanks you can simply slip the shanks into the holes of any empty section perforated hardboard with ¼" holes. The shank of the router bit will fit snugly and the bits won't fall out. If you use ½" shank bits, you can drill a few ½" holes in your hardboard near where you do most of your routing. Space these holes far enough apart that the cutters on your bits don't touch.

—from the* WOOD® *magazine shop

Continued on page 26

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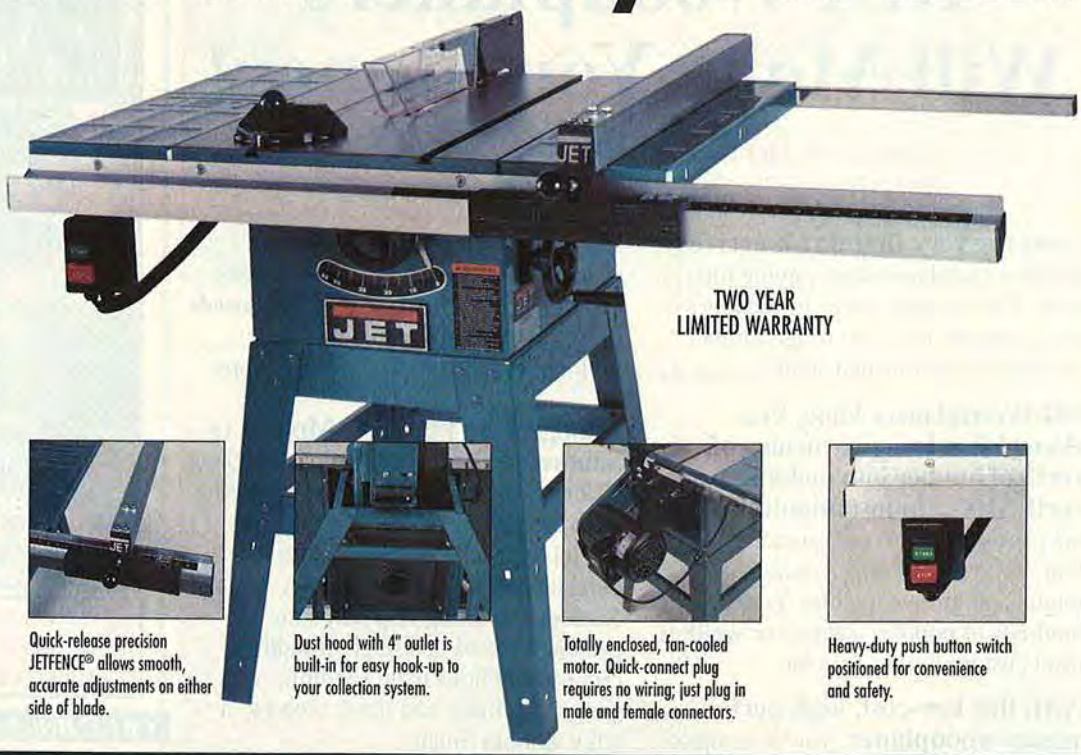

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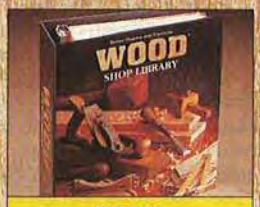

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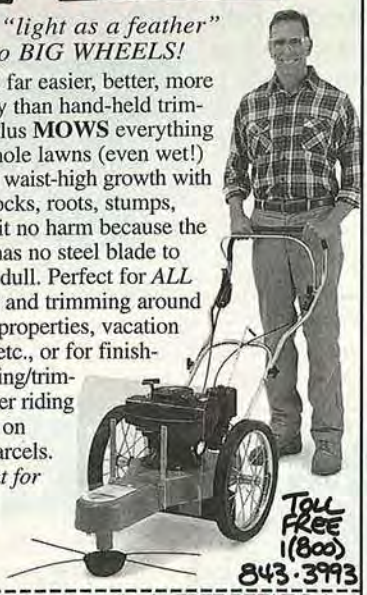

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TIPS FROM YOUR SHOP (AND OURS)

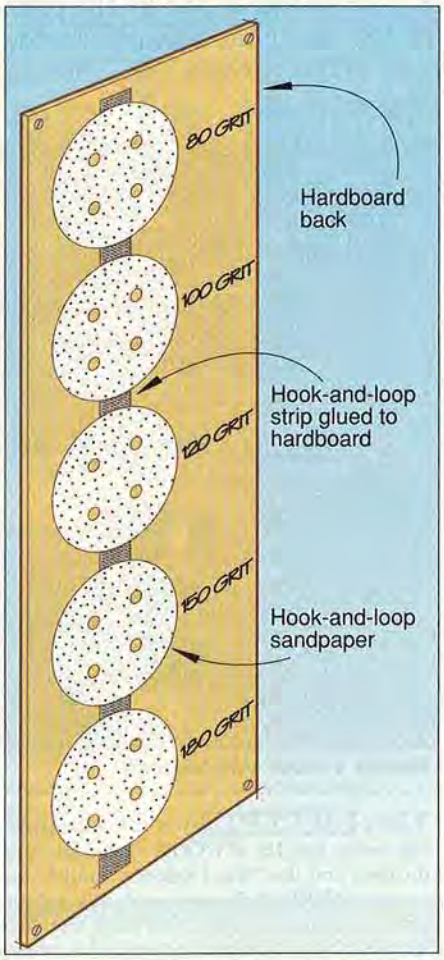
Continued from page 24

Hook-and-loop strip organizes sanding pads

You've been patiently sanding a project with your random-orbit sander and successively finer grits. But now you've got four hook-and-loop discs on your benchtop and it's hard to read the grit size on their bottoms. You can easily make a mistake substituting the 120-grit disc for the 180 grit.

TIP: Organize your various grits of paper with a hook-and-loop strip, available at sewing-supply stores. Tack the strip to a piece of hardboard and mount it on your wall near where you normally sand. Then, mark the grit size next to the appropriate pad. Now you've got all the discs at your fingertips, and you always know which one to grab.

—Darrell Nieschwitz, Canton, Ohio



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OSHA
WELL, WITH MR. CLINTON'S CLEAN AIR ACT, I'VE BEEN REAL BUSY WRITING TICKETS.
WOW! THIS SHOP IS PERFECT. THIS IS THE CLEANEST SHOP I'VE EVER SEEN. I SEE YOU HAVE A DUST COLLECTOR BUT HOW DO YOU KEEP IT SO CLEAN?
OSHA
A FEW MONTHS AGO I SPENT MORE TIME CLEANING UP THAN WORKING. THEN I FOUND OUT ABOUT TOTAL SHOP DUST SYSTEMS. FIRST I GOT MY DUST COLLECTOR BUT I STILL HAD A PROBLEM WITH AIRBORNE DUST. THEN CAME MY CLEANAIR SYSTEM. TOTAL SHOP USES A UNIQUE THREE-STAGE FILTRATION SYSTEM TO CAPTURE 97% OF THE DUST IN THE AIR. IT EVEN HAS A 15" THICK FILTER INSIDE. IT MOUNTS ON THE CEILING SO IT'S NEVER IN THE WAY. AND I LIKE THAT IT'S 100% AMERICAN MADE!
MY SHOP'S CLEAN, WHY THE TICKET?
OSHA
NO. NO MR. PYLES. I'M WRITING TOTAL SHOPS TOLL FREE NUMBER. I HAVE GOT TO ORDER A CLEANAIR SYSTEM TODAY!
CleanAir System
Made in USA

And here are just a few more advantages the *CleanAir System* has over the competition...

- Needs no outside venting
- Effectively cleans the air in an area up to 4000 cubic feet
- Totally quiet operation
- Has no effect on existing room temperature
- Runs on standard house current
- Compact size (25" x 13" x 40") fits almost anywhere
- Heavy gauge steel cabinet with mounting holes
- Contains approximately 18 square feet of filter material
- Easy filter replacement
- Also available in heavy duty model
- 30 day money back guarantee
- One year warranty on all parts
- Built in the USA with a 5 year track record of total customer satisfaction!

Why continue fighting the never ending battle with dust? Order NOW and receive absolutely FREE our Extended Lifetime Warranty ($29.95 value!)

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CLEANAIR SYSTEM
260 CFM order # 90175
Suggested List Price $339
NOW $269
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Suggested List Price $399
NOW $309
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***Filter Replacement Kit* • order # 90176 • $29.95**

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ZIP_____ PHONE_____
☐ PLEASE SEND MORE INFORMATION
☐ I WANT TO ORDER #_____
CHECK, M/C, VISA, DISCOVER, AMEX
CARD #_____ EXP. DATE____

Total Shop
WORLD OF WOODWORKING

P.O. BOX 25429 • GREENVILLE, SC 29616

Circle No. 940

TIPS FROM YOUR SHOP (AND OURS)

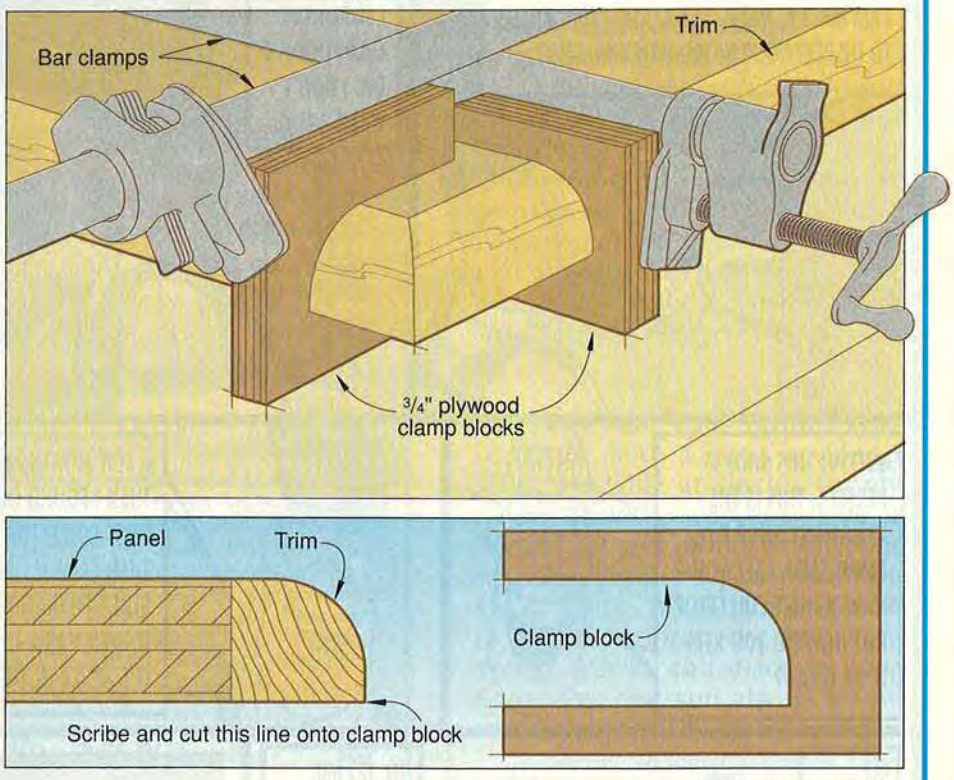
Continued from page 26

Put the squeeze on curved-profile edges

The flat face of a clamp will press evenly against a square piece of edging. But how do you clamp a curved-profile edge-molding such as a bullnose or quarter-round?

TIP: Make your own curved-profile clamping blocks, and you can securely clamp edge molding of any shape. Start by cutting some 3×4" blocks from scrap pieces of ¾" plywood. Next, crosscut a thin section of your edge molding, and scribe the profile of the molding onto your clamp blocks as indicated in the drawing at *right*. Cut this shape on the plywood with a scrollsaw or coping saw and sand the cut edges smooth. Now, slip the blocks between the workpiece and the clamp jaws, and tighten the clamps.

—Julien Kogej, Alameda, Calif.



Continued on page 30

Give Yourself Some Breathing Room.

Recent medical studies show that breathing wood dust can be hazardous to your health. The JDS AIR-TECH 2000 will dramatically improve the quality of the air in your workshop.

A powerful 500 CFM motor delivers 350 CFM of filtered air. This will clean the air in a 20 x 20 x 8 foot shop six and a half times per hour.

The JDS AIR-TECH 2000 will remove 99% of dust particles as small as five micron and 80% of the particles as small as one micron.

Our unique design makes both ceiling installation and filter changing quick and easy.

To place an order or for the dealer near you call 1-800-382-2637. And give yourself some breathing room.

JDS AIR-TECH 2000™

$259.00

Another quality product from JDS COMPANY

1-800-382-2637

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Here's the one thing Belgians don't waffle on.

The Robland X31 is as welcomed in European workshops as a home run in the World Series. We put together a 12" jointer, 12" planer, 10" table saw, 50" sliding table, and a shaper with a mortiser. No cheating. No compromises. Some 1100 lbs. of cast iron stability, with three separate 3HP motors. It stays put. It stays true. and it stays neatly in a little corner of your shop. That's why Belgians call the Robland X31 The Intelligent One Man Shop. About the only thing you can't make on it is breakfast.

LAGUNA TOOLS

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Like Having A Lumberyard Right In Your Shop!

Craftsmen everywhere are using the low-cost Woodmaster to **bring in welcome extra cash** and to **save** on all their lumber needs. You can, too!

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You can do custom work for friends, neighbors, lumberyards, picture framers, home remodelers, hobby shops and businesses.

Because it takes just seconds to convert a $2 rough board into $10 worth of finished trim, you can see why so many Woodmaster owners enjoy substantial extra incomes!

Variable Speed Makes The Difference!

Just a twist of the dial gives you perfect control for planing, sanding or sawing...from 0 to 1,000 cuts per inch. Creates mirror-smooth molding with no sanding required!

Here's what Woodmaster owner L. C. Griffin of Los Angeles writes: *"The shop test article in **Wood Magazine** that said they loved your Variable Feed Rate is what sold me. They were right."*

Call or write today for free facts on how you can try this **American-made** tool in your own shop for one full month. Easy terms.

Woodmaster's Quick-Change Molding Head lets you create custom moldings from any stock. Choose from over 250 standard trim and picture frame patterns...or design your own!

Power-fed sanding speeds production and improves the quality of your work. No more waves or cross-grain scratches Separate sanding head installs in just minutes.

New ripsaw attachment lets you gang-rip with power feed in a fraction of the time it takes for multiple hand-fed passes on an ordinary table saw.

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FREE FACTS

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For metal, leather, fabrics, ceramics, furniture and plastics, Arrow's professional hot melt glue guns assure fast, permanent bonding. The Arrow TR550, with easy squeeze lever action, has a built-in safety stand, interchangeable nozzle and clutch mechanism for consistent flow. Arrow also offers Hot Melt Removable Weatherstripping to seal out winter chills or summer heat.

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TIPS FROM YOUR SHOP (AND OURS)

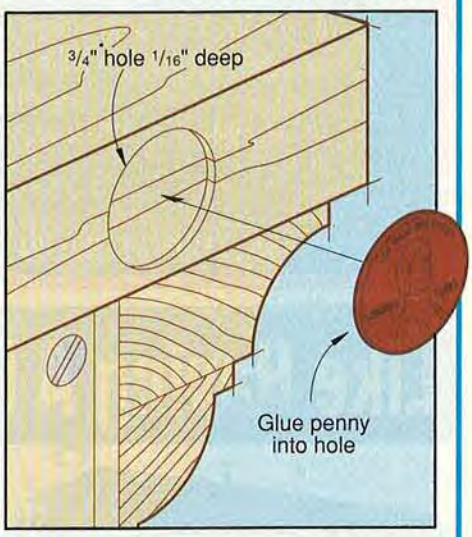
Continued from page 28

Date your heirloom projects with a penny

In the old days, master craftsmen carved the date of completion on a seldom-seen surface of a big project. You would like to leave a small mark in history too, but you're not sure about your wood-carving skills.

TIP: An easy way to date your heirloom projects is to use a shiny new penny. Take a ¾" Forstner bit and bore a 1/16"-deep hole in an out-of-the-way place on the project. Secure the penny in the hole with a dab of epoxy.

—Carl Sarine, Largo, Fla.



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- Want to rout a classical edge profile without using a special bit? The procedure shown in the Federal mirror on *page 65* uses two common router bits.
- When you bought your lathe it probably came with a cup-type dead tail center. If you tossed it aside in favor of a live tail center, find out how you can use it for a drive center in the article on *page 52*.
- Ever wonder why spray finishes sometimes develop the texture of an orange-peel? Find out why in the Spray-Finishing story on *page 46*.

CMT is your source for fine cutting tools!

CMT's Diamond Knife Hone

Keep planer & jointer knives in tip-top shape!

Put the world's hardest substance to work on your planer and jointer knives! Features two 4" long sharpeners coated with 325- and 600-mesh micro diamonds. The mahogany body indexes hone to cutter and best of all, there's no need to remove the knives from your jointer or planer!

DKH-001 Diamond Knife Hone.....$24.40

Premium Quality Planer & Jointer Knives

High Speed Steel Specialty Knives Perfectly match your planer or jointer!

Item	Knives	Fits	Sale (set)
SPK-005	2	Ryobi JP155	$32.30
SPK-025	2	Ryobi AP10	$32.70
SPK-030*	2	Makita 2012 planer	$35.00
SPK-035	2	Ryobi AP12 planer	$30.50
SPK-040	2	Ryobi AH-115 & AH-125	$60.80
SPK-045	2	Makita 2030N planer	$42.70
SPK-055*	2	Delta 22-540	$30.20
SPK-060	2	Makita 2040	$51.80

*Double Edged Knife

HSS Knives

Hold a very keen edge that's ideal for hard or soft wood

(Number of knives in parenthesis)

Item #	Description	Sale
SJK-005	4" Knives for Delta,Craftsman & other (3)	$14.80
SJK-010	6" Knives for old Delta, Craftsman (3)	$21.80
SJK-015	6-1/16" Knives for Delta DJ-15 (3)	$22.80
SJK-020	8" Knives for old Delta & Rockwell (3)	$28.90
SJK-025	8-1/16" Knives for Delta DJ-20 (3)	$29.60
SJK-030	12" Knives for Powermatic (3)	$41.90
SJK-035	12-1/2" Knives for RBI 612 & 812 (2)	$29.90
SJK-040	12-1/2" Knives for Grizzly & other (2)	$30.90
SJK-045	13-1/8" Knives for Delta RC-33 (3)	$47.40
SJK-055	15" Knives for Grizzly & other imports (3)	$52.90
SJK-065	20" Knives for Parks 20" planer (4)	$92.40
SJK-070	20" Knives for Delta 20" & others (4)	$93.90
SJK-075	20-1/2" Knives for RBI 820 (3)	$71.50

CMT's Exclusive Carbide Tipped Knives

Deliver superb performance & long life, even in plywood, particleboard and other abrasive materials

(Number of knives in parenthesis)

Item #	Description	Sale
SCK-005	4" Knives for Delta,Craftsman & other (3)	$53.50
SCK-010	6" Knives for old Delta, Craftsman (3)	$79.00
SCK-015	6-1/16" Knives for Delta DJ-15 (3)	$81.00
SCK-020	8" Knives for old Delta & Rockwell (3)	$106.40
SCK-025	8-1/16" Knives for Delta DJ-20 (3)	$107.52
SCK-030	12" Knives for Powermatic (3)	$176.00
SCK-035	12-1/2" Knives for RBI 612 & 812 (2)	$111.00
SCK-040	12-1/2" Knives for Grizzly & other (2)	$111.00
SCK-042*	12-1/2" Knives for Delta 22-540 (2)	$154.00
SCK-045	13-1/8" Knives for Delta RC-33 (3)	$165.00
SCK-055	15" Knives for Grizzly & other imports (3)	$179.00
SCK-065	20" Knives for Parks 20" planer (4)	$334.00
SCK-070	20" Knives for Delta 20" & others (4)	$379.00
SCK-075	20-1/2" Knives for RBI 820 (3)	$234.40

* Solid Carbide double-edged knives

Solid Carbide, Double Edge Knives for Portable Power Planers

These long-lasting knives fit almost any* 3-1/4" portable power planer!

Item	Fits	Sale (set)
SCK-006	AEG, Bosch, Freud, Hitachi, Makita, Metabo & similar power planers	$11.60

*Some older portable planers may require an adapter plate. Please contact your dealer or the manufacturer.

CMT's *Award-Winning* Joint-Master™ Dado Set

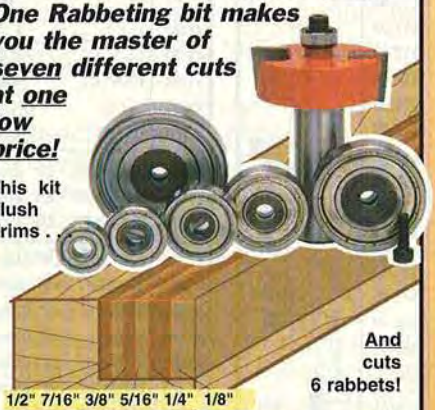
With our 3/32" Ply-Groove Chipper!

- 24 carbide teeth
- Four-wing chippers
- 5/8" bore
- Six Chippers: 4 @ 1/8", 1 @ 3/32", 1@ 1/16"
- Cuts grooves from 1/4" to 29/32"

108-240X 8" Anti-kickback Dado Set $179.00

CMT's Rabbet-Master Plus™

One Rabbeting bit makes you the master of seven different cuts at one low price!



This kit Flush Trims . .

And cuts 6 rabbets!

1/2" 7/16" 3/8" 5/16" 1/4" 1/8"

800-639 1/4" Shank Rabbet-Master Plus.....$36.90
800-640 1/2" Shank Rabbet-Master Plus.....$39.90

CMT has bit sets for all the finest jigs!

Our 12-Piece set for Leigh's D3 Jig includes 9 Dovetail & 3 Straight Bits

800-502 .12-Piece Set for Leigh Jig $149.40
800-500 .8-Pc. 1/4" shank set: Incra & JoinTECH ...$99.90
800-501 .8-Pc. 1/2" shank Set: Incra & JoinTECH .$109.90
800-611 .6-Piece Set for P•C OmniJig™ $108.60
800-617 .5-Pc. Set for Keller 1601 Jig $134.00
800-618 .4-Pc. Set for Keller 2401 Jig $127.00

The color orange on router bits is a registered trademark of CMT TOOLS

Solid Brass Router Template Guide Kit

- Includes eight guides with OD's of 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 51/64" &1 plus two locknuts
- Fits Porter•Cable, Black & Decker and other bases with an 1-3/16" hole in the base.

We have adapters for almost any router: $14.90 each!

BTG-001 Brass Template Guide Kit $39.40

NEW!

Maxi-Combo™ and Ultra-Cut™ Blades *with CMT's sound suppression design and master sharpener Matt Ver Steeg's remarkable tooth geometry!*

Buy both and save over $30.00

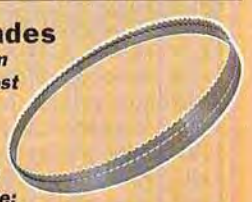
• The Maxi-Combo's Chamfered Raker tooth delivers ultra-smooth cutting, virtually eliminating chipping in fine plywood, veneer & solid stock.

• The Ultra-Cut's high top bevel slices the outside edges of the kerf first for chip-free cuts in 2-sided laminate.

110-500 ..10x50 Maxi-Combo™ $62.90
110-800 ...10x80 Ultra-Cut™ Laminate Blade $67.20
110-233 ...Both Blades: *SAVE $30.20* $99.90

Band Saw Blades

CMT carries premium quality blades for most popular band saws. We stock blades in thirteen lengths. Call us for your size! Here's a small sample:



93-1/2" Blades fit Delta's 14" saws plus 14" saws by, Enlon, Elephant, Reliant, Grizzly & more!

Item	Width	Pitch	Style	Sale
BSB-931	1/8"	14 TPI	Std.	$14.00
BSB-932	3/16"	4 TPI	Skip	$9.70
BSB-933	3/16"	10 TPI	Std.	$9.70
BSB-934	1/4"	6 TPI	Skip	$9.70
BSB-935	3/8"	4 TPI	Skip	$10.00
Heavy-duty resaw blades:				
BSB-936	3/4"	3 TPI	Hook	$11.90
BSB-937	3/4"	3 TPI	Skip	$11.90
BSB-938	3/4"	6 TPI	Std.	$11.90
BSB-939	3/4"	10 TPI	Std.	$11.90
BSB-930	1"	3 TPI	Hook	$13.90
BSB-193	1"	8 TPI	Std.	$13.90
BSB-293	1"	14 TPI	Std.	$13.90

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If you have questions or require assistance with your order, please call between 9 am & 6 pm ET

In Canada, call: ToolTrend Ltd. 1-800-387-7005
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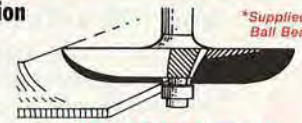
Circle No. 1310

MLCS

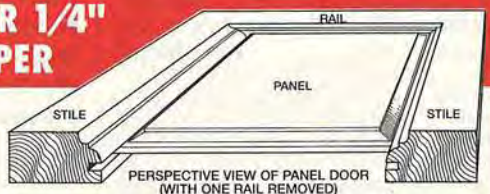
MAKE BEAUTIFUL RAISED PANEL DOORS WITH YOUR 1/4" OR 1/2" ROUTER OR WITH YOUR 1/2" OR 3/4" SHAPER

Professional production quality bit makes it quick and easy to produce matching rails and stiles - the panel raising bit with ball bearing guide makes the raised panel perfect every time!



RAISED PANEL ROUTER BIT
SUPPLIED with BALL BEARING
CARBIDE TIPPED
*2" Large Diameter (1/4" Shank)
*3-1/2" Large Diameter (1/2" Shank)
4-5/8" Large Diameter (Shaper)

***REVERSIBLE COMBINATION RAIL and STILE BIT**
(For making matching rails and stiles in raised panel doors, etc.) Works with stock from 11/16" to 7/8".



PERSPECTIVE VIEW OF PANEL DOOR (WITH ONE RAIL REMOVED)

SIZE & FORM	ITEM #	PRICE/SET
1/4" Shank Router	#1301	$69.95
1/2" Shank Router	#1302	$79.95
1/2" Shaper	#1303	$99.95

Regular Value *Over* $150.00!

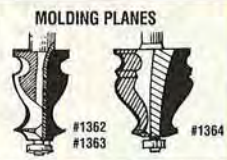
SAVE 55%

CARBIDE TIPPED ROUTER BITS • PROFESSIONAL PRODUCTION QUALITY *GUARANTEED* • WHEN ORDERING ANY THREE OR MORE *DEDUCT $1.00 EACH* • FREE SHIPPING IN CONTIGUOUS USA

ITEM NO.	DESCRIPTION (ALL 2 FLUTED)	SHANK SIZE	PRICE
#1314	ROUND OVER - 1/8" Radius	1/4"	$11.00
#1315	ROUND OVER - 3/16" Radius	1/4"	$11.00
#1368	ROUND OVER - 1/4" Radius	1/4"	$12.00
#1316	ROUND OVER - 5/16" Radius	1/4"	$14.00
#1369	ROUND OVER - 3/8" Radius	1/4"	$15.00
#1370	ROUND OVER - 1/2" Radius	1/4"	$17.00
#1317	ROUND OVER - 1/4" Radius	1/2"	$12.00
#1318	ROUND OVER - 3/8" Radius	1/2"	$15.50
#1319	ROUND OVER - 1/2" Radius	1/2"	$17.00
#1320	ROUND OVER - 3/4" Radius	1/2"	$21.00
#1333	TONGUE & GROOVE - Straight	1/4"	$29.00
#1334	TONGUE & GROOVE - Straight	1/2"	$29.00
#1335	TONGUE & GROOVE - Wedge	1/4"	$29.00
#1336	TONGUE & GROOVE - Wedge	1/2"	$29.00
#1337	FLUSH TRIM -3/8" Diameter -1" Cutting Length	1/4"	$ 7.50
#1338	FLUSH TRIM -1/2" Diameter -1" Cutting Length	1/4"	$ 8.00
#1339	FLUSH TRIM -1/2" Diameter -1-3/16" Cutting Length	1/2"	$ 8.00
#1340	PATTERN / FLUSH TRIM -1/2" Diameter	1/4"	$15.00
#1341	PATTERN / FLUSH TRIM -3/4" Diameter	1/4"	$17.00
#1342	PATTERN / FLUSH TRIM -3/4" Diameter	1/2"	$19.00
#1351	LOCKMITRE -7/8" Cutting Length	1/4"	$32.00
#1352	LOCKMITRE -1-1/8" Cutting Length	1/2"	$45.00
#1353	OGEE RAISED PANEL -2" Large Diameter	1/4"	$28.00
#1354	OGEE RAISED PANEL -2-3/4" Large Diameter	1/2"	$32.95
#1389	SPIRAL UPCUT - 1/8" Diameter (solid carbide)	1/4"*	$ 9.95
#1390	SPIRAL UPCUT - 1/4" Diameter (solid carbide)	1/4"	$13.25
#1391	SPIRAL UPCUT - 1/4" Diameter (solid carbide)	1/2"*	$15.45
#1392	SPIRAL UPCUT - 3/8" Diameter (solid carbide)	1/2"*	$26.45
#1393	SPIRAL UPCUT - 1/2" Diameter (solid carbide)	1/2"	$33.00

*PROPER ADAPTER WILL BE SUPPLIED

ITEM NO.	DESCRIPTION (ALL 2 FLUTED)	SHANK SIZE	PRICE
	MOLDING PLANES		
#1362	1" C.L.	1/4"	$24.95
#1363	1-5/8" C.L.	1/2"	$29.95
#1364	1-5/8" C.L.	1/2"	$31.95
#1365	1" C.L.	1/4"	$31.95
#1366	1-11/16" C.L.	1/2"	$31.95
#1330	BULL NOSE - 1/2" Diameter of Circle	1/4"	$16.00
#1331	BULL NOSE - 3/4" Diameter of Circle	1/4"	$21.00
#1332	BULL NOSE - 3/4" Diameter of Circle	1/2"	$21.00
#1371	STRAIGHT - 1/4" Diameter	1/4"	$ 6.50
#1372	STRAIGHT - 3/8" Diameter	1/4"	$ 6.50
#1373	STRAIGHT - 1/2" Diameter	1/4"	$ 7.00
#1374	STRAIGHT - 3/4" Diameter	1/4"	$ 9.50
#1375	STRAIGHT - 3/8" Diameter	1/2"	$ 7.50
#1376	STRAIGHT - 1/2" Diameter	1/2"	$ 8.00
#1377	STRAIGHT - 3/4" Diameter	1/2"	$10.00
#1378	COVE - 1/4" Radius	1/4"	$12.00
#1379	COVE - 3/8" Radius	1/4"	$13.00
#1380	COVE - 1/2" Radius	1/4"	$14.00
#1381	COVE - 1/2" Radius	1/2"	$15.00
#1382	ROMAN OGEE - 5/32" Radius	1/4"	$16.00
#1383	ROMAN OGEE - 1/4" Radius	1/4"	$17.00
#1384	ROMAN OGEE - 1/4" Radius	1/2"	$18.00



Special

SLOT CUTTER SET

5/32" Slot Cutter - 1/4" Shank. Plus 250 #20 Biscuits.
"Biscuit Joining with your Router", Instructional sheet included.
Order Item #1385

FAST & EASY

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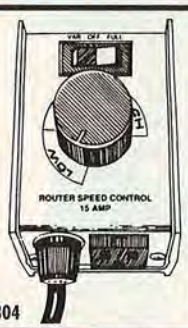

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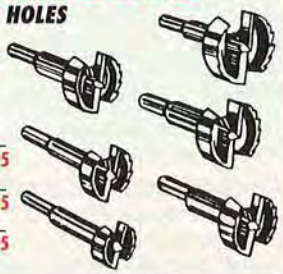

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BASSWOOD

Carvers make a beeline for this tree

Among the most important of America's nectar-producing trees, the basswood makes itself at home along city streets as well as in the forest. In cityscapes, nurserymen call the hardy, decorative tree American linden. But in the woods, it's basswood, beetree, lime, or whitewood. Regardless of its name, basswood has proven its value.

Indians of New York state's Iroquois nation carved ceremonial masks from the sapwood of living basswood trees, then split the green-wood masks from the trunk. The gummy inner bark provided bandages. And from its dried fibers they wove rope.

Beekeepers even today appreciate the quality of basswood-derived honey. In summer, the tree's fragrant flower clusters provide a strong-flavored nectar. Basswood stock also becomes the very boxes in which the honeycombs are stored and shipped.

Wood identification

The forest-products industry lumps the four native North American basswood species together in the marketplace, for there are few differences between them, except where they grow. *Tilia americana*, of the northern Great Lakes states, provides most of the basswood harvested.

In a setting of mixed hardwoods in the well-drained ground of a stream valley, basswood can grow to 90' tall with a straight trunk 3' in diameter. But because basswood sprouts from the stump, it's often seen as a clump of three or four smaller trunks.

Young basswood trees feature light gray, smooth bark, while that of older trees becomes darker and deeply ridged. In late winter, small reddish-brown buds appear on branch twigs. Their nutlike flavor signals that you've found a basswood tree.

When leaves form, they have a distinctive heart shape with lightly serrated edges. The leaves also display an unusual trait: The undersides, not the tops, are shiny. Clusters of sweet-smelling white or cream-colored flowers follow the leaves.

Weighing about 26 pounds per cubic foot air-dried, the wood has a tan color, and in some cases may be nearly white. You'll find the grain of this soft hardwood straight, close, and normally featureless. Occasional basswood stock may display some dark stain,

Natural range

which doesn't affect the wood's performance but may mar a project. Dry basswood is stable.

Uses in woodworking

Carvers prefer basswood because it holds detail well, doesn't split, has straight-grain, and carves easily. They usually prefer air-dried, slow-grown northern stock.

Basswood also can become drawer stock, hidden furniture parts, and painted items. In industry, it plays a role as boxes and food containers. As veneer, it can underlie fine cabinet woods in plywood. This light, versatile wood also works for picture frames, toys, and millwork such as window sashes. It even makes fine turning wood.

Availability

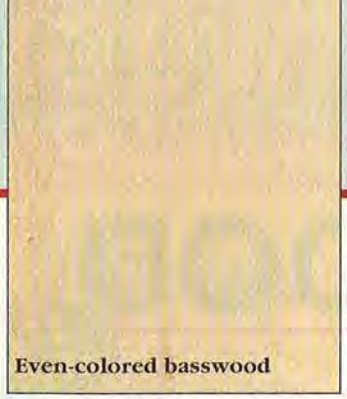
Many large hardwood retailers outside its natural range carry basswood in board form. Specialty suppliers offer basswood carving blocks and blanks.

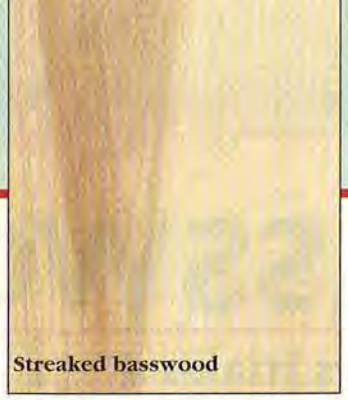
Expect to pay around $2 per board foot for select and better 4/4 stock, and about $3 and more per board foot for thicker boards. Veneer isn't available at retail.

Continued

basswood

(Tilia americana)


Even-colored basswood


Streaked basswood

Both northern and southern varieties of basswood show little contrast between early wood and late wood, although northern basswood provides tighter-grained, finer-textured stock. Carvers also will want to avoid basswood with mineral stains, unless the project will be painted.

If you're a carver who likes to gather stock yourself—and live where basswood grows—try this method to dry your wood. Harley Refsal, *WOOD®* magazine's carving consultant, dries his northern-Iowa basswood this way: He cuts 18" lengths from a log or large branch, then halves and quarters them with an ax. Next, he removes the pith (inner core of the heartwood) and wraps each quarter completely with two layers of newspaper. Harley fastens the wrapped stock between the floor joists in his basement furnace room and leaves them to air dry for six to eight weeks. In the summertime, he dries the wood overhead in the garage.

Not a carver? You still may want to try this easily worked wood. Here's some guidance:

Machining methods

- Basswood's low-hardness rating makes it ideal for hand tools.
- Power planing basswood poses no problems. You'll find jointing effortless, too.
- Because the wood is dense, ripping requires a rip-set blade with 24 teeth or less to avoid burning. In crosscutting, it won't tear out or chip.
- Use sharp bits and don't rush the router when shaping basswood, as its tight grain and density does tend to burn (although burns easily sand off).
- Unlike some other lightweight, straight-grained woods (such as redwood), basswood fastens well with nails or screws. And it's not necessary to predrill.
- Sanding basswood proves to be a soothing, smoothing task. But when it comes to staining, blotching can result. If uneven staining appears on a test piece, apply wood conditioner before staining. Remember, though, even wood conditioner won't subdue discolored streaks in the wood.

Carving comments

It would be hard to find a wood more perfect for carving. A sharp knife or gouge slides through it as if cutting butter. And the finish of a clean cut looks lustrous.

- Because basswood takes fine detail, it's great for relief, figure, and chip carving.
- Basswood requires control or your carving tool may go further along a stroke than planned.
- Strengthen details subject to breakage with a thinned coat of woodworker's glue (it won't take stain) worked into the wood.

Turning tricks

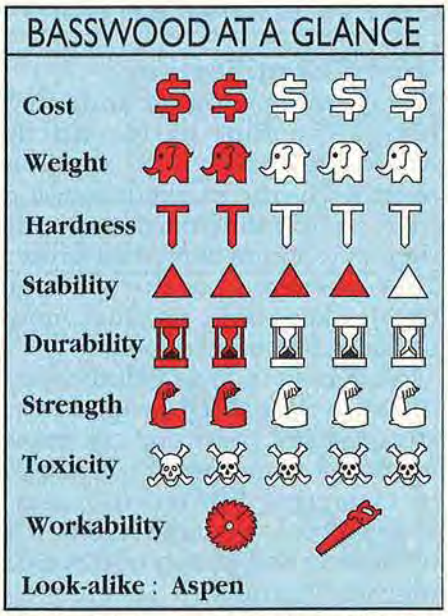
Woodturners will find basswood superb for food containers, since it imparts no odor or taste.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions—and tips pertaining to this issue's featured wood species—appear under other headings on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 90-degree angle. To avoid tearing, feed figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32".
- For clean cuts, rip with a rip-profile blade having 24-32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid using twist drills. They tend to wander and cause breakout. Use brad-point bits and a backing board under the workpiece to reduce tearout.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped, bits and take shallow passes to avoid burning.
- Carving softwoods, and a soft hardwood like basswood, means fairly steep gouge bevels—greater than 20°.

BASSWOOD AT A GLANCE



Compiled with woodworker Dale Hink and carver Harley Refsal Illustrations: Steve Schindler

HITCH WAGONS FROM THE HEARTLAND

Missouri wagonmaker and wheelwright Gary Stull takes as much pride in his craft as he does in his purebred Belgians.

Forty-five-year-old Gary Stull spent 20 years crafting classic furniture of high-priced stock for the wealthy "carriage trade." Today, though, he's better known for the carriages—or rather—he calls them hitch wagons—that come from his rural Ash Grove, Missouri, shop.

Quite a switch! What's it like to move from elegant turned, carved, and heavily ornamented Honduras mahogany furniture to horse-drawn work wagons of unpretentious white oak and yellow poplar? "What's amazing about building a wagon is how much I can get by with that I never could on a piece of furniture," Gary jokes. Then, more seriously, he explains why his wagons draw raves. "People like my attention to detail, such as the fine sanding of the wood and the

Continued

Print this article

HITCH WAGONS

Sawed to an 11¼° angle at the hub end, each spoke wedges against another as Gary drives them in with a hammer around the wheel.

paint job. Sanding a piece of wood smooth is probably a holdover from the furniture business that pays off on my wagons."

And since 1989, when Gary decided to forsake the pressure of custom furniture and begin building wagons full-time, he's turned out nearly 200 and delivered them across the nation. One $16,000 model even went to a brewery in Hamilton, New Zealand. And as we found out on a visit to Gary's country wagon shop, building wagons presents a woodworking challenge every bit as great as fine furniture.

A place where wagons of old live on

The road to Gary Stull's wagon shop winds through the emerald pastures, hay fields, and small stands of hardwood forest that mark the northern edge of the Ozarks. Only the sign reading "Registered Belgians" indicates your arrival at Heartland Hitch Wagons. Unless, of course, Gary happens to be test driving a newly completed wagon behind his pair of golden draft horses. Then, he'd trot the team over, rein in, and pull to a stop.

Swinging down from the seat, he'd tip his hat back and greet you with a "Hi there!" After introductions, the talk would quickly turn to wagons.

"I heard a story once about a milkman in Chicago back when they used horse and wagon for door-to-door delivery," says Gary. "Well, this one particular milkman had been on the same route with the same horse for a long, long time—maybe 20 years.

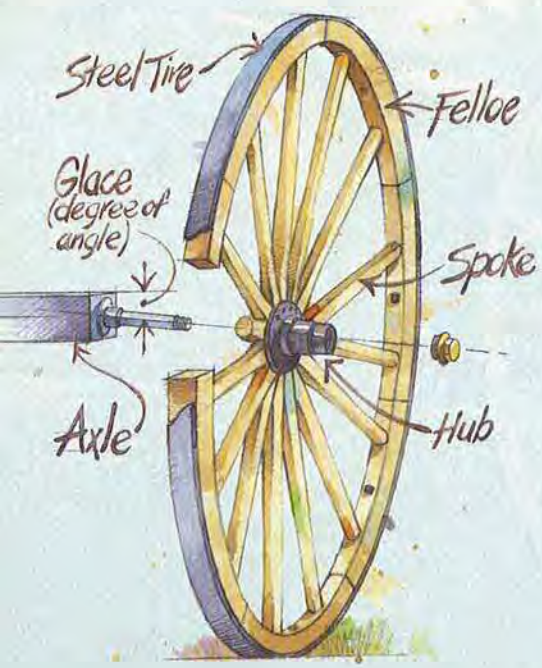
"The day came when the dairy had to replace his aging horse," he continues. "So, on the first day with the new horse the milkman was back at the dairy in a few hours, with his whole load of milk! It seems that the milkman had lost his eyesight long ago—without telling anyone—and had depended on his old horse's habitual stop-and-go pattern to deliver to the houses on his route!"

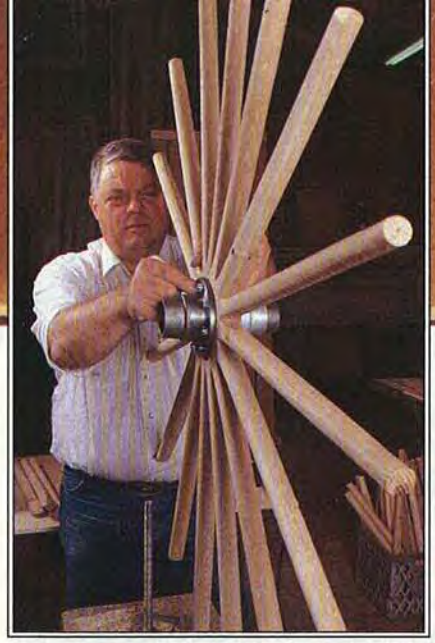
Gary's fondness for the story not only shows his love for horses, but his keen interest in wagons and the role they played. He has volumes of reference on the subject, and bases his wagon designs on photographs and drawings of wagons found in those books.

"I say that my wagons are authentic," Gary comments. "But I take some liberties with them—modern adaptations—because technology has improved over what it was 100 years ago. For instance, sawed felloes on the wheels (see drawing *below left*). Most places today curve them by steam bending. I bandsaw mine like they did years ago, but with modern equipment it goes faster, it's more consistent, and there's no difference in reliability."

Gary is pretty straightforward about his product, too. "I don't know too much about the fine carriages and that class of vehicle. My background has always been draft horses—I've raised Belgians since 1976," he says proudly, "so I build work wagons and people haulers—buckboards, surries, ranch wagons, express wagons for drayage [hauling], and spring wagons like this one here that I just finished.

"Now a spring wagon is a generic term," he goes on, directing his gaze toward the glistening red wagon before him. "At different places around the country, it might be called several different names, like a 'democrat' out East. In the Ozarks, it's a 'hack.' And a spring wagon with benches in the back is commonly called a wagonette. I built a wagonette to haul tourists around the Alamo in San





The wagonmaker checks the wheel for proper dish after all the spokes have been driven home in the hub.

A cone plane chucked into a hand brace points the end of each spoke to act as a guide for the tenon cut.

At the drill press, Gary cuts a tenon on the end of each pointed spoke in the wheel for a tight joint with the felloes.

A 16-spoke wheel has eight felloes, each tapped into place on the spokes by hand, then joined and anchored to one another with wooden splines.

Antonio. But always, when this type of wagon is set up with the box suspended by the springs, the term is spring wagon. On the other hand, a buckboard is just that; there's no springs in the board. They're all in the seat."

Gary's brochure lists and pictorially describes other wagons he has made and will make, from chuck wagons to pleasure carts, and even custom wagons of a buyer's design. And the customer can be sure that Gary makes each of them to exacting standards that begin with the wood.

Wagons long on labor

"When you build a wagon, the cost of the lumber is incidental compared to the total price," notes the wagonmaker. "There's not that much lumber in a wagon. A spring wagon like this [see photo *page 35*] sells for $3,000, but there's probably only $100 worth of wood in it. The rest is mostly labor and metal."

Gary uses yellow poplar for wagon boxes mainly because it's light, strong, and paints well. He buys white oak that comes from the surrounding hills for his wagon wheels and other wooden suspension parts. And it's thick 6/4 and 8/4 kiln-dried stock.

"The same qualities that make white oak good for barrels make it

Continued

HITCH WAGONS

To expand the metal, Gary heats the steel wagon tires in a large stock tank that serves as a fire pit. When the rims get nearly red hot, he withdraws one to fit to the wheel. His father, Duane, waits to lend the wheelwright a hand.

ideal for wheels," Gary explains. "It has straight grain and closed cells that repel water. And white oak won't split as readily as red oak does."

White oak wasn't always the traditional choice, though, according to Gary. Back when wagons and buggies were about the only vehicular transportation, wood wasn't shipped around the nation like it is today. Wagonmakers back then often looked for a wood that was available in their area. "In Missouri, Oklahoma, and Kansas, I understand that local wagon shops even made wheels out of Osage orange, " he says. "In the East, a lot of elm was used. And where hickory grew, they turned to that—and still do. Heck, I'd even use walnut because it's a good strong, sturdy wood, but people would say, 'Ugh, that's walnut! You're supposed to make furniture out of that.' Well, that's because people are used to seeing light-colored wheels. But all you have to remember about wagon stock—that is, all the structural pieces, not the box—is that it has to be a kind of wood that's known to be springy, like white oak, ash, and hickory."

Using a wheelwright's measuring device called a traveler, Gary measures the exact circumference of the wheel. After bending the channel steel for the tire, he'll cut it 3/8" smaller.

Building the basic box

Building a wagon box isn't a complicated woodworking process. Basically, the box's frame (or sides) consist of 4/4 yellow poplar assembled with miter joints, like a picture frame. The 4/4 floorboards, also of yellow poplar, have tongue-and-groove edges and are set into rabbets cut in the box. And angle-iron braces show up everywhere for support. "The idea is to build a frame—the wagon box—that will rack," notes Gary. "It has to give, but not come apart. That's why all the pieces are screwed together, not glued. There's nothing elaborate to making a wagon bed, and when it comes to buckboards, if you can build a picnic table, you've got it." Making the wagon's most important parts, the wheels, is quite another story, however.

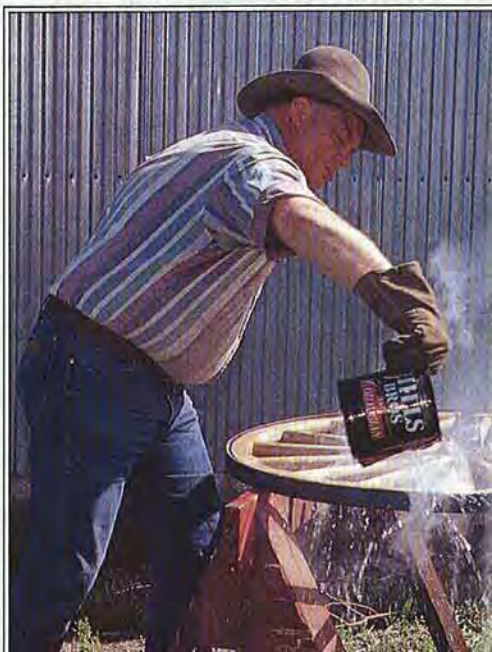
Woodworking geometry

When Gary began building wagons, he ordered wheels from Amish craftsman in Ohio and Pennsylvania. That didn't work.

"The Amish are very independent, and if they had to milk cows or do something else, they didn't build my wheels. And I had delivery dates on wagons," Gary recalls. "So I taught myself how to build them, and just developed my own process. There are a lot of operations involved in wheelmaking, but none of them is very time-consuming."

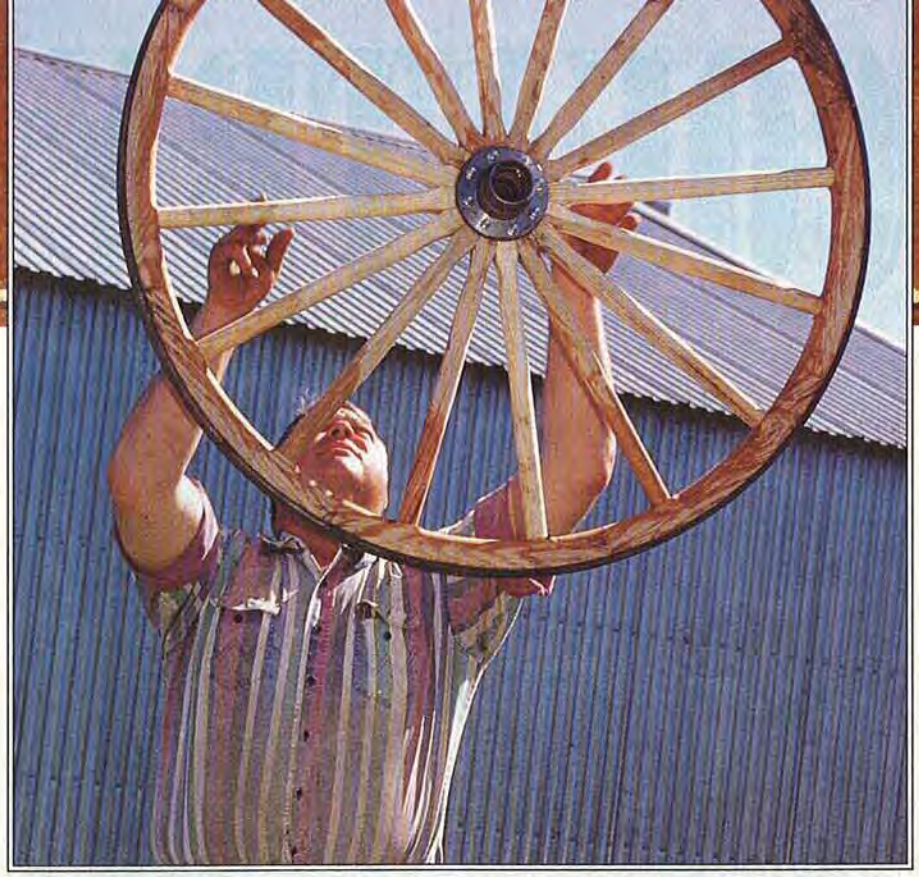
Gary contends that wheelmaking is all geometry. "All the angles are based on a 360-degree circle," he says. That's fact, but his most telling axiom rings even more true: "If you don't have a wheel, you don't have a wagon."

Basically, wagon wheels have these components (shown in the drawing, *page 36*): hubs, spokes, felloes, and a tire. The burly wag-



The hot steel tire requires only a slight tapping with a hammer to fall into place around the wheel. Then, to speed the shrinking of the hot steel, Gary pours cold water on the tire.

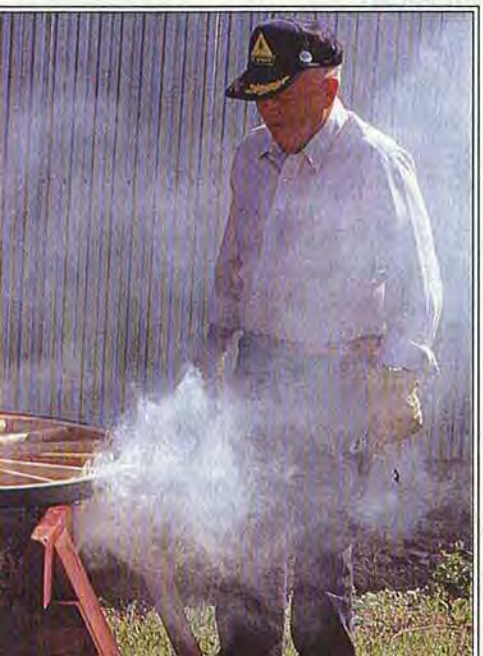
In the final cold water bath, the wooden wheel pops as all the wooden parts slip tightly into place under the force of the cooling and shrinking steel.



To prove that the wheel, tightened by the addition of the steel tire, is tight as a drum, Gary tosses it into the air to bounce on the ground.

onmaker purchases the roller-bearing hubs and the axles from manufacturers in Ohio, but makes all the other parts and assembles them in his wagon shop. The photographs here and on the previous pages show the most important procedures, but there's still a lot to know about regarding the philosophy behind a wheel.

"A wagon's axles are gauged or glaced, that is, bent slightly downward on the ends," explains Gary. "That's because the wheels have a dish in them, kind of like a saucer shape. And the dish is always to the outside. The dish that I build in provides a natural spring action that also uses the elasticity of the wood to keep all the parts of the wheel tight.



"You see, at any one time, there's only one spoke in contact with the ground and holding the weight of the wagon," he continues. "And you don't have to be a woodworker to know that any piece of wood is strongest in endwise compression. So, you want to keep that piece of wood, that spoke, perpendicular to the ground. There's the reason for the bent axle—if you put the wheel on a straight one, it wouldn't be perpendicular to the ground at any time."

Gary assembles all the wheels for a wagon over a three-day period, culminating on the last day when the channel-steel tires go on. And quite literally, that's when the wheelwright's aspect of wagonmaking really comes together.

"I don't use any glue in a wheel except where the spokes go into the hub," says Gary, "because when I shrink that hot steel band of tire on, all the parts have to slip a little. Then, as the steel cools, it shrinks, and like a giant clamp, it draws everything up tight. Sometimes you can actually hear the wood poppin'."

Gary has made 54"-diameter wagon wheels with ¾"-thick steel tires that were 3½" wide. He's also made wheels scaled to a wagon built for miniature horses that were 28" in diameter. And he's never had a complaint on a wheel. Nor a wagon, either. That's because, like the furniture he crafted for so many years, he takes pride in the wheels and wagons that he now builds. "I really don't care if I lose money, time-wise, on a wagon," Gary says, sincerity in his deep voice. "I won't quit until I feel happy with what I've made." And that makes customers happy.

Wagons ho!

For a copy of Gary's wagon brochure, send your request with a stamped, self-addressed business-sized enveloped to: Gary Stull, 3420 North State Highway F, Ash Grove, MO 65604.

Written by Peter J. Stephano
Photographs: Bob Hawks
Illustration: Brian Jenson

COUNTRY HALL

Liven up an entry or hallway with this popular piece of furniture. Stain it to match your woodwork or give it our stain and paint treatment for a more exciting look. Either way, this functional bench serves as a handy seat for a moment's rest when taking off your boots and as handy storage for mittens, scarves, hats, and other outerwear.

Note: *This piece was designed to function as a typical deacon's bench. If you plan to use it for toy storage or where children will be opening and closing it, you must add lid supports to prevent the heavy edge-joined seat from falling shut and possibly pinching small hands and fingers.*

Start with the front, back, and end panels

1 From 1 1/16" stock (commonly called five-quarter stock), cut the base frame rails and stiles (A, B, C, D) to the sizes listed in the Bill of Materials. (We used birch.)

2 Mount a ½" dado blade to your tablesaw. Raise the blade ½" above the surface of the saw table. Cut a groove in a piece of 1 1/16" stock, and check that a piece of ½" plywood fits in the groove. Adjust if necessary. Cut a ½" groove ½" deep in the inside edge of each stile and rail where shown on the Panels drawing.

3 Using a miter-gauge extension and stop, cut rabbets to form tenons on the ends of the rails (A, C) to the sizes shown on the Tenon detail accompanying the Panels drawing.

4 Mark the cutlines for the bevels on the bottom inside edge of the stiles (B, D) as dimensioned on the Panels drawing.

5 Cut eight ½×½×2" filler blocks. With the bottom ends of the filler blocks flush with the bottom ends of the stiles (B, D) flush, glue and clamp one block into the groove in each stile. Cut just outside the marked cutline on each stile. Then, sand the bevel-cut stile and filler block.

6 From ½" birch plywood, cut the front and back panels (E) and end panels (F) to size. Dry-clamp the four frame-and-panel assemblies to check the fit. Then, glue and clamp the assemblies, checking for square.

7 With the outside edges and top and bottom ends flush, glue and clamp the four frame-and-panel assemblies together in the configuration shown on the Exploded View drawing.

Give the base assembly a bottom

1 Cut the cleats (G, H) to size. Drill countersunk screw holes through two adjoining surfaces of each cleat.

2 With the bottom edges of the cleats flush with the bottom edges of the bottom rails (A, C), screw the cleats in place.

Continued

Print this article

SEAT

Beautify an entry with this practical storage solution

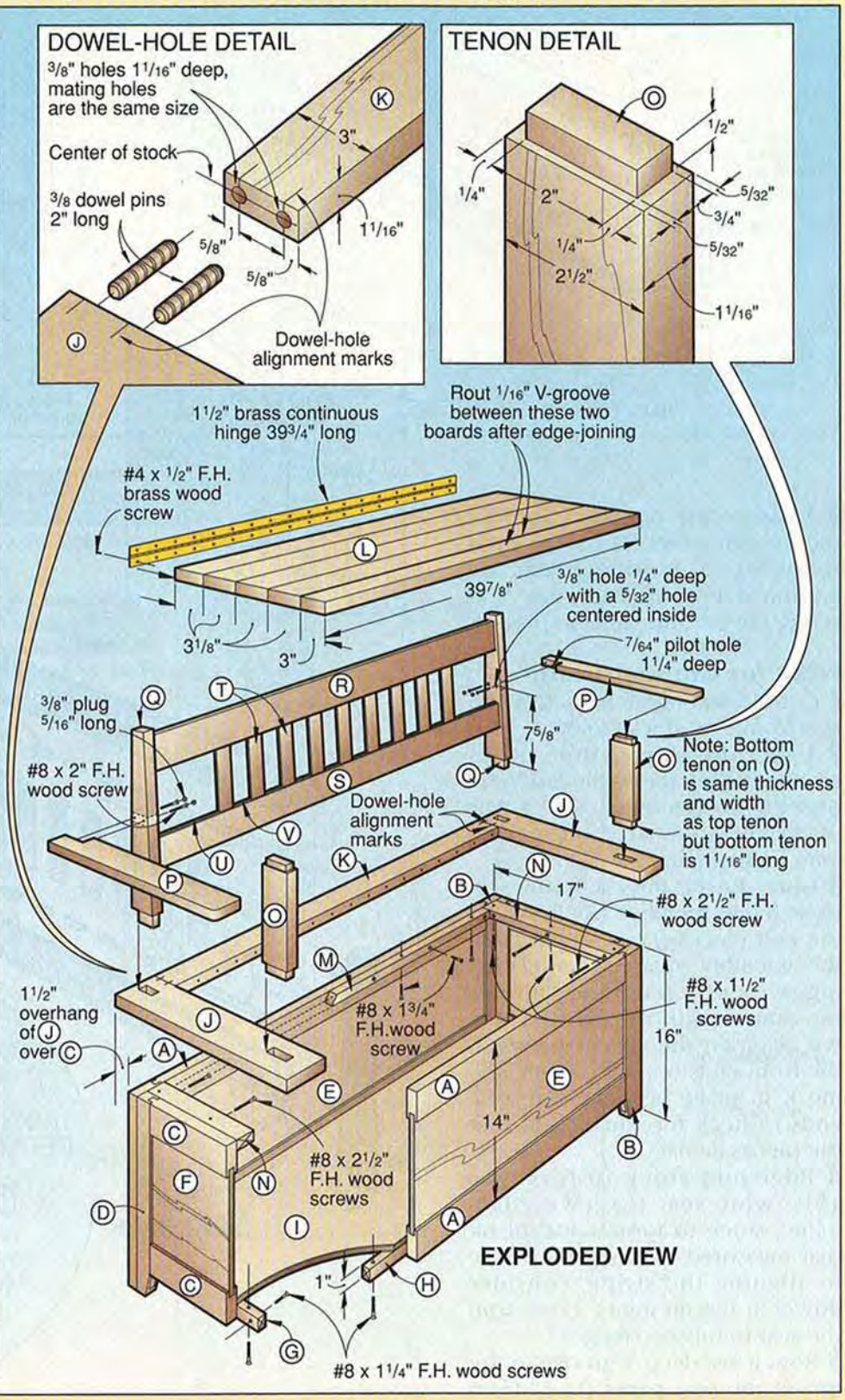
Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
FRONT & BACK PANELS					
A rails	1 1/16"	2 1/2"	41"	B	4
B stiles	1 1/16"	2 1/2	16"	B	4
C rails	1 1/16"	2 1/2"	13"	B	4
D stiles	1 1/16"	1 7/16"	16"	B	4
E front & back panels	1/2"	10"	41"	BP	2
F end panels	1/2"	10"	13"	BP	2
BOTTOM ASSEMBLY					
G cleats	3/4"	1"	14 7/8"	B	2
H cleats	3/4"	1"	41 3/8"	B	2
I panel	1/2"	14 7/8"	42 7/8"	BP	1
SEAT ASSEMBLY					
J sides	1 1/16"	4"	18 1/2"	B	2
K back	1 1/16"	3"	40"	B	1
L* seat	1 1/16"	15 1/2"	39 7/8"	EB	1
M back cleat	1 1/16"	1 1/4"	38 7/8"	B	1
N side cleats	1 1/16"	2"	14 7/8"	B	2
ARMRESTS & SUPPORTS					
O armrest supports	1 1/16"	2 1/2"	8 13/16"	B	2
P armrests	3/4"	2 1/2"	18 1/2"	B	2
SEAT BACK					
Q stiles	1 1/16"	2 1/2"	17 1/16"	B	2
R top rail	3/4"	3"	44 3/8"	B	1
S bottom rail	3/4"	2 1/2"	44 3/8"	B	1
T splats	1/4"	1 1/2"	6"	B	9
U* spacers	1/4"	3/8"	6 1/16	B	4
V spacers	1/4"	3/8"	2"	B	16

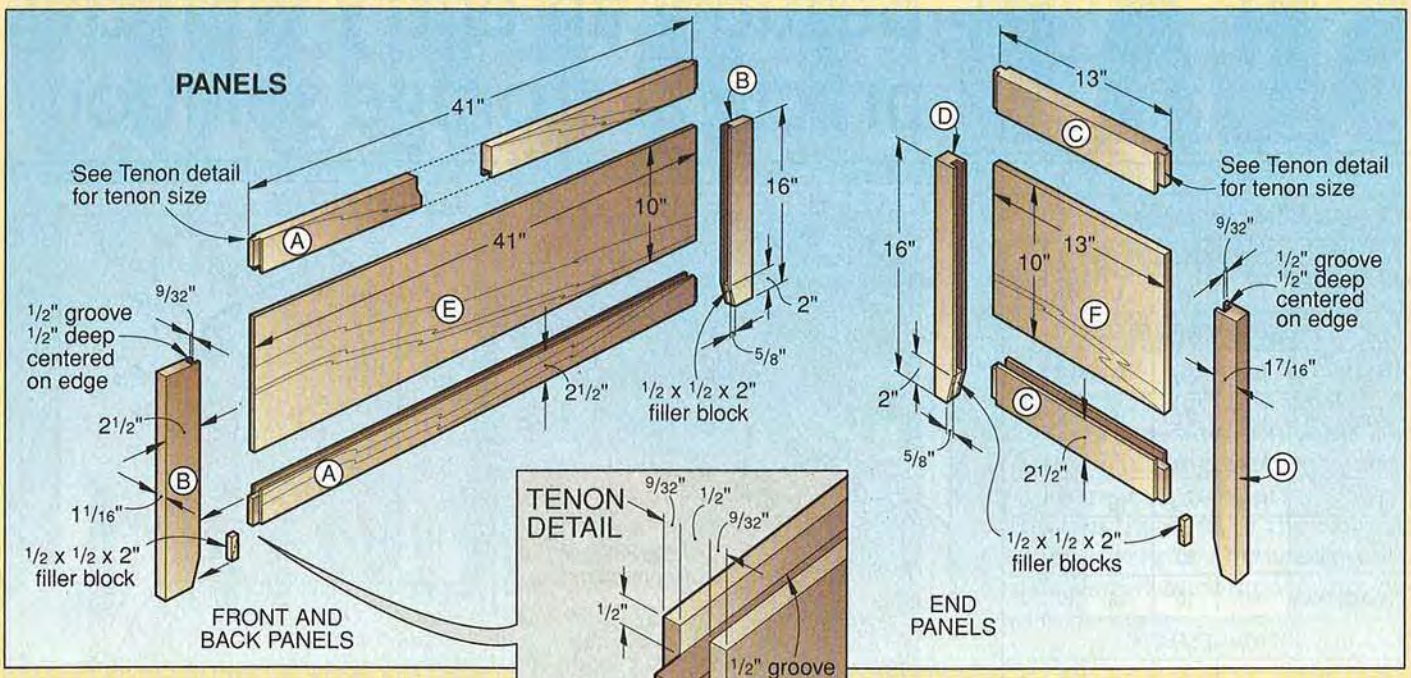
*Initially cut parts with an * oversized. Then, trim each to finished size according to the how-to instructions.

Materials Key: B–birch, BP–birch plywood, EB–edge-joined birch.

Supplies: #8×1 1/4", #8×1 1/2", #8×1 3/4", #8×2", #8×2 1/2" flathead wood screws; 3/8" dowel pins 2" long; 1 1/2" brass continuous hinge 39 3/4" long with #4×1/2" flathead brass wood screws; dark green (Hunter green) spray enamel; stain; clear finish.



COUNTRY HALL SEAT



3 Measure the opening, and cut the bottom panel (I) to size from ½" plywood. Working from the bottom side of the base, glue and screw the bottom panel in place.

Now, for the seat frame

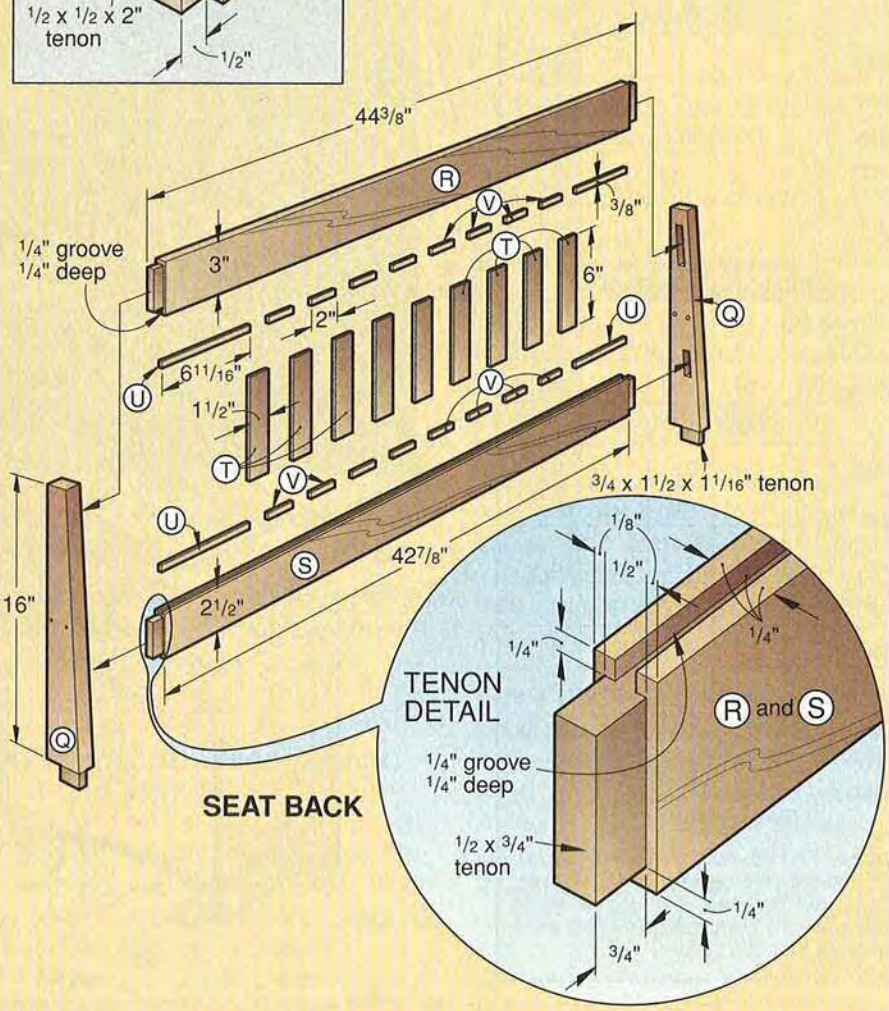
1 Cut the seat frame parts (J, K) to size from 1 1/16"-thick stock.

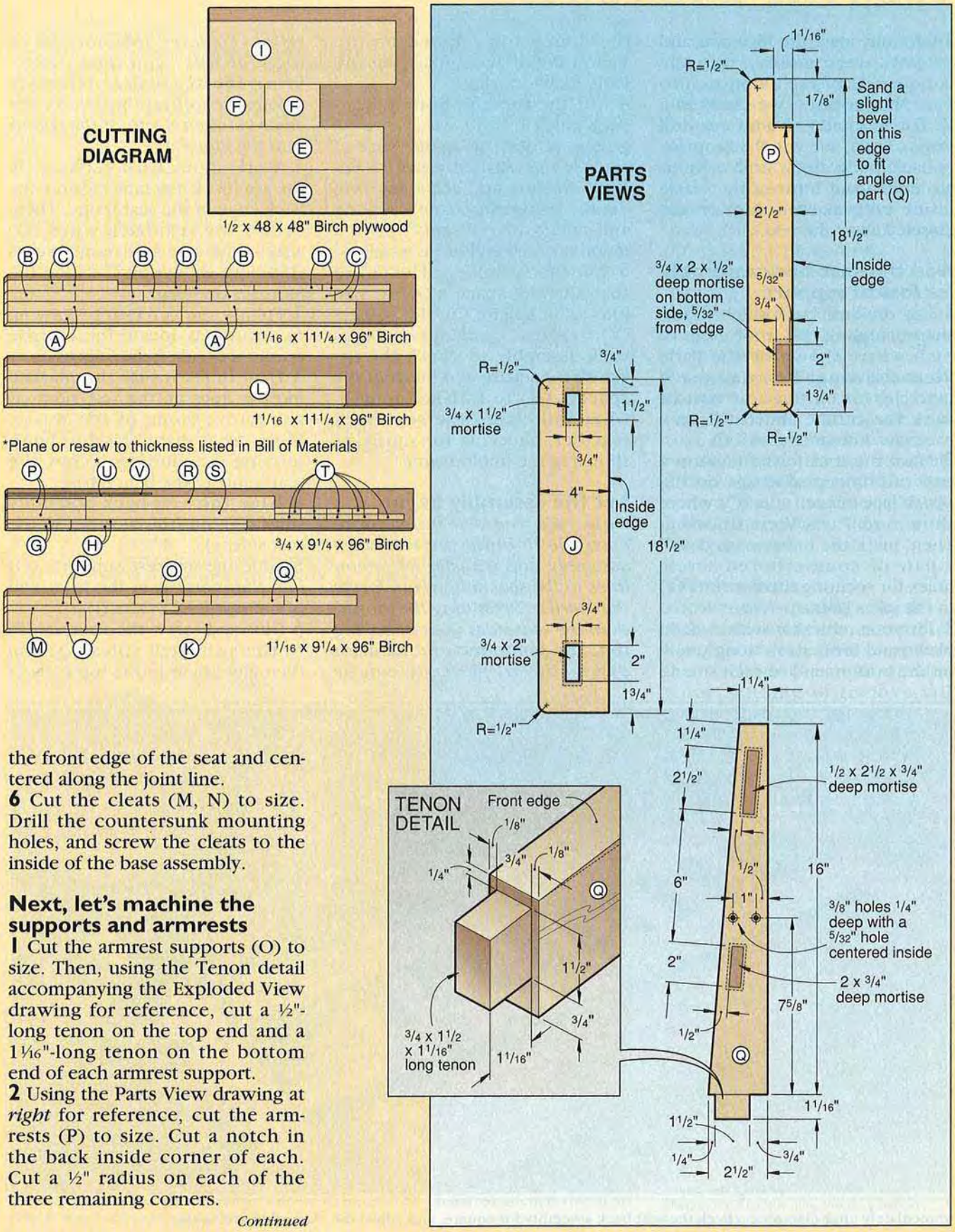
2 Using the Dowel Hole detail accompanying the Exploded View drawing for reference, drill a pair of dowel holes at each mating joint joining parts J to K.

3 Glue, dowel, and clamp the seat back frame member (K) between the end pieces (J). (To help keep the assembly square when clamping, we cut a temporary spacer the same length as part K. Then, we clamped the spacer between the front ends of parts J when gluing K in place between the back ends.) Check for square and that the pieces lie flat.

4 Edge-join stock to form the 15½"-wide seat (L). (We edge-joined stock to form a seat blank that measured 41" long.) For ease in aligning the strips, consider dowel or biscuit joints. Later, trim the seat to finished length.

5 Rout a 1/16"-deep V-groove in the top of the seat panel (L) 3" from





the front edge of the seat and centered along the joint line.

6 Cut the cleats (M, N) to size. Drill the countersunk mounting holes, and screw the cleats to the inside of the base assembly.

Next, let's machine the supports and armrests

1 Cut the armrest supports (O) to size. Then, using the Tenon detail accompanying the Exploded View drawing for reference, cut a ½"-long tenon on the top end and a 1 1/16"-long tenon on the bottom end of each armrest support.

2 Using the Parts View drawing at *right* for reference, cut the armrests (P) to size. Cut a notch in the back inside corner of each. Cut a ½" radius on each of the three remaining corners.

Continued

COUNTRY HALL SEAT

3 Carefully mark the locations and cut a ½"-deep mortise into the bottom side of each armrest. (To form the mortises, we chucked a ⅝" flat-bottomed bit into our drill press. Then, we set the stop for consistent ½"-deep holes. Next, we drilled out most of the waste inside each marked mortise and chiseled away the rest.)

Add the seat-back assembly for lots of support

1 Cut the seat back stiles (Q) to shape, angling the front edge of each where shown on the Parts View drawing. You can use a taper jig for cutting this part or mark the cutline and cut it on a bandsaw and sand it smooth.

2 Mark the locations and form a pair of ¾"-deep mortises on the *inside* face of each stile (Q) where shown on Parts View drawing. Then, mark the locations and drill a pair of counterbored screw holes for securing the armrests (P) to the stiles later.

3 Fit your tablesaw with a dado blade, and form a 1⅛"-long tenon on the bottom end of each stile to the dimensions shown on the Tenon detail accompanying the Parts View drawing.

4 Cut the top and bottom seat-back rails (R, S) to size. Cut a ¼" groove ¼" deep along one edge of each where shown on the Seat-Back drawing and accompanying detail. Using the same drawing and detail for reference, form a tenon on each end of each rail.

5 Cut the ¼"-thick splats (T) to size. Cut the spacers (U) to size plus ½" in length. Cut the spacers (V) to size. Dry-clamp the seat-back assembly to check the fit. Check for square and the trim the spacers (U) to finished length. Glue and clamp the seat back together, checking for square as shown in the photo *below*.

Let the assembly begin

Note: *We found it much more accurate to build the seat-back assembly and transfer the tenon lines to the seat sides (J) to locate the mortise. Precutting the mortises in the seat sides (J) and hoping that the seat-back and armrest assemblies fit perfectly can be risky. Forming the mortises in the seat sides and then assembling the seat-back assembly allows absolutely no room for error between the fit of the tenons into the mortises.*

1 Working on a flat surface, lay the seat-back assembly against the back edge of the seat frame. Then, center the seat-back stiles (Q) against the seat side frame pieces (J) where shown on Locating the Mortises drawing.

2 Follow the three-step drawing to accurately locate the mortise on the seat side frame pieces.

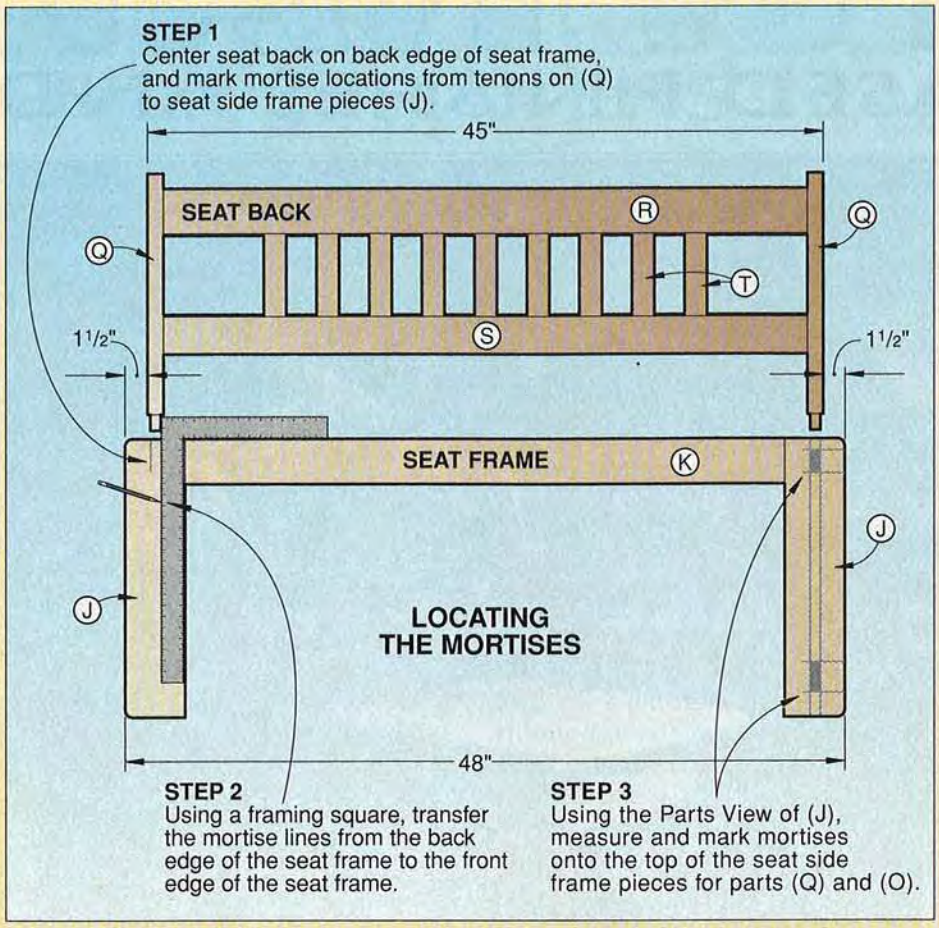
3 Drill holes inside the marked mortise lines on the seat sides (J) to remove some of the waste. Next, use a sharp chisel to finish forming the mortises. Screw the seat frame to the bench base.

4 Glue the seat-back assembly stiles (Q) into the mortises in the seat sides (J).

5 Glue the armrest supports (O) into the mortises in the front end of the seat frame sides (J).

6 Glue and screw the armrests (P) to the seat-back stiles (Q) and then glue them to the top ends of

Immediately after clamping, check the seat-back assembly for square, and adjust the clamps as necessary.


STEP 1
Center seat back on back edge of seat frame, and mark mortise locations from tenons on (Q) to seat side frame pieces (J).
45"
SEAT BACK
R
Q
Q
T
S
1 1/2"
1 1/2"
SEAT FRAME
K
J
J
LOCATING THE MORTISES
48"
STEP 2
Using a framing square, transfer the mortise lines from the back edge of the seat frame to the front edge of the seat frame.
STEP 3
Using the Parts View of (J), measure and mark mortises onto the top of the seat side frame pieces for parts (Q) and (O).

Working from inside the base, screw through the cleats to secure the seat-frame/seat-back assembly to the base.

the armrest supports (O). While the glue is still wet, use clamps to snug-up the armrest supports between the armrests and seat-frame ends. Do the same for a tight joint between the seat-back stiles and the seat-frame sides (J).

7 Cut plugs and plug the four counterbored screw holes on the inside face of each seat-back stile (Q). Sand the plugs flush.

8 Centered from side-to-side and with the back edges flush, screw the seat-frame/seat-back assembly to the cleats (M, N) as shown in the photo *below left*.

9 Drill pilot holes and attach the continuous hinge to the back edge of the seat (L) and the front edge of the seat-frame back member (K). Check that the front edge of the seat is flush with the front ends of the seat-frame sides (J). Trim if necessary. Remove the hinge for now.

Try this for a showroom-quality finish

1 Finish-sand the assembled bench and seat. (We've noticed that birch needs careful attention when sanding to remove mill marks. Inadequate sanding can result in blotches when stained.)

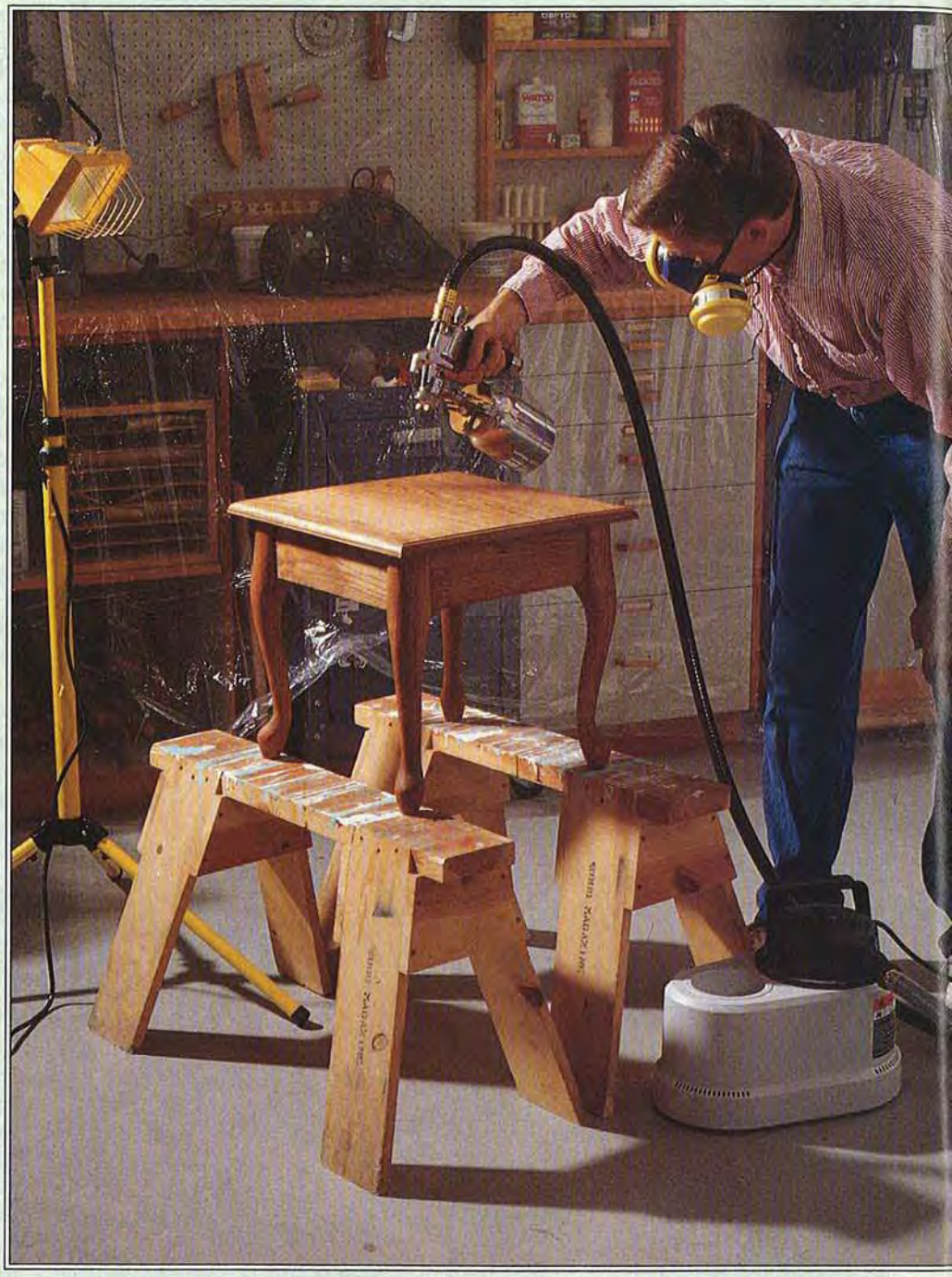
2 Stain the entire bench and apply two coats of clear finish to the entire bench.

3 Mask the unpainted areas shown in the opening photo, and spray-paint the remaining areas. (After painting our base with Hunter green spray enamel, we felt the painted surfaces were too bright and shiny. To tone this down and for a slightly worn look, we wrapped 220-grit sandpaper around a sanding block and lightly sanded the edges, sanding just through the paint so the underlying stained area was exposed. Then, we used 00 steel-wool to lightly dull the finish.) Reattach the continuous hinge.

Written By Marlen Kemmet
Project Design: James R. Downing
Illustrations: Kim Downing; Roxanne LeMoine
Photographs: John Hetherington

CLEANER, GREENER SPRAY-WATER-BASED FINISHES AND

Picture this if you will. You just completed a project that required hundreds of dollars worth of wood, using thousands of dollars of woodworking machinery. Now, are you going to apply the finish with a $5 brush? We hope not. If you've always admired the smooth, rich looks that come with a spray finish, but avoided the process because of all the complications, take heart. Help has arrived.



You can achieve professional results in a home shop

Woodworking pros know the value of a sprayed-on finish. But conventional spray guns and solvent-based finishes demand expensive equipment and shop setups that most of us home woodworkers can't afford. Now there's a better, safer way—combining HVLP spray equipment with water-based finishes.

HVLP stands for high-volume, low-pressure. In contrast to conventional spray guns, which blast out air at up to 40 pounds per square inch, HVLP units need only 4 to 10 psi to get the job done. The result: up to 85 percent of the finish lands on the workpiece compared with 35 percent for conventional sprayers. You waste less finish, and you don't coat everything in your shop with overspray.

The second ingredient to this winning recipe is a water-based finish. Unlike oil-based finishes, water-based finishes don't give off toxic, flammable fumes. With them, you don't need an explosion-proof ventilation system, and you can safely spray water-based finishes in the basement or a shop attached to your house.

Taking advantage of the opportunities offered by HVLP systems and water-based finishes does require some education, though. So here's our five-step program to get you started on the kind of woodworking finish you've always wanted.

FINISHING

HVLP SPRAYERS MAKE IT EASY

OUR FIVE-STEP PROGRAM FOR SPRAY-FINISHING SUCCESS

STEP 1 CHOOSE YOUR EQUIPMENT WISELY

Manufacturers offer two different types of HVLP setups—turbine-based machines that pump their own air, and conversion-air systems (CAS) that hook up to an air compressor. *Below*, we compare the two systems, but for the techniques in this article, we'll concentrate on the turbine-based systems since they are usually better suited to the home woodworker.

Turbine-based systems. The beauty of turbine-based systems is that they send out a warm stream of air and finish. This helps water-based finishes dry faster and flow out smoother, particularly during periods of high humidity. Portability also ranks high on the list of advantages. You can carry these compact units by hand or roll them around in the shop.

Turbine-based spray systems have one or more blowers that force air through a 1"-diameter hose and into a spray gun. They are rated as one, two, or three stage, corresponding to the number of blowers. Extra blowers increase the pressure of the air coming out the gun, which helps spray thick-bodied finishes and speeds up work on larger projects. The one-stage machines do a fine job of spraying water-based polyurethanes, as well as paints and oil-based products that are thinned according to manufacturers' instructions. A two-stage machine will handle unthinned finishes and larger projects better, and three-stage machines are used primarily by production shops. Prices for one-stage systems range from $180 to $350, two-stage turbines go for $300 to $800, and three-stage units cost around $900 to $1,200.

Conversion-air systems (CAS). CAS sprayers rely on air coming from an air compressor. Changing this high-pressure air to low-pressure, high-volume air requires a specialized CAS spray gun, or a pressure-conversion regulator that attaches to the air inlet port on an HVLP gun.

This might seem like a way to get into the HVLP game without spending a lot of money because all you buy is the gun. But CAS guns generally cost $250 to $350. They also require a compressor with a minimum of 3 to 5 hp and an air-delivery rate of at least 10–20 cfm at 60–80 psi. With a large compressor, however, CAS systems do a nice job of atomizing thick finishes.

A potential source of problems with CAS sprayers is the oil or water that occasionally gets into the hose of an air compressor. To eliminate these contaminants, you must attach a filter to the air outlet on the compressor.

Continued

Here are samples of three different types of HVLP sprayers. The three-stage turbine-based Accuspray 23i, left, the Binks Mach I CAS gun in the middle, and the single-stage Wagner Professional FineCoat.

SPRAY-FINISHING

STEP 2 GET TO KNOW WATER-BASED FINISHES

The techniques you may have used in applying oil-based finishes won't always work with water-based products. Knowing the do's and don'ts of water-based finishes will prevent problems and improve your results.

How to control grain raising. All water-based finishes, sprayed or not, will raise the grain of your wood. The solution? Put on a light first coat, and let it dry. Then, lightly sand the surface with 220-grit sandpaper. Be careful not to sand through the finish and into the bare wood. Subsequent coats will not raise the grain.

Whatever you do, never smooth a water-based finish with steel wool. Small fragments of steel will become embedded in the finish and create rust stains.

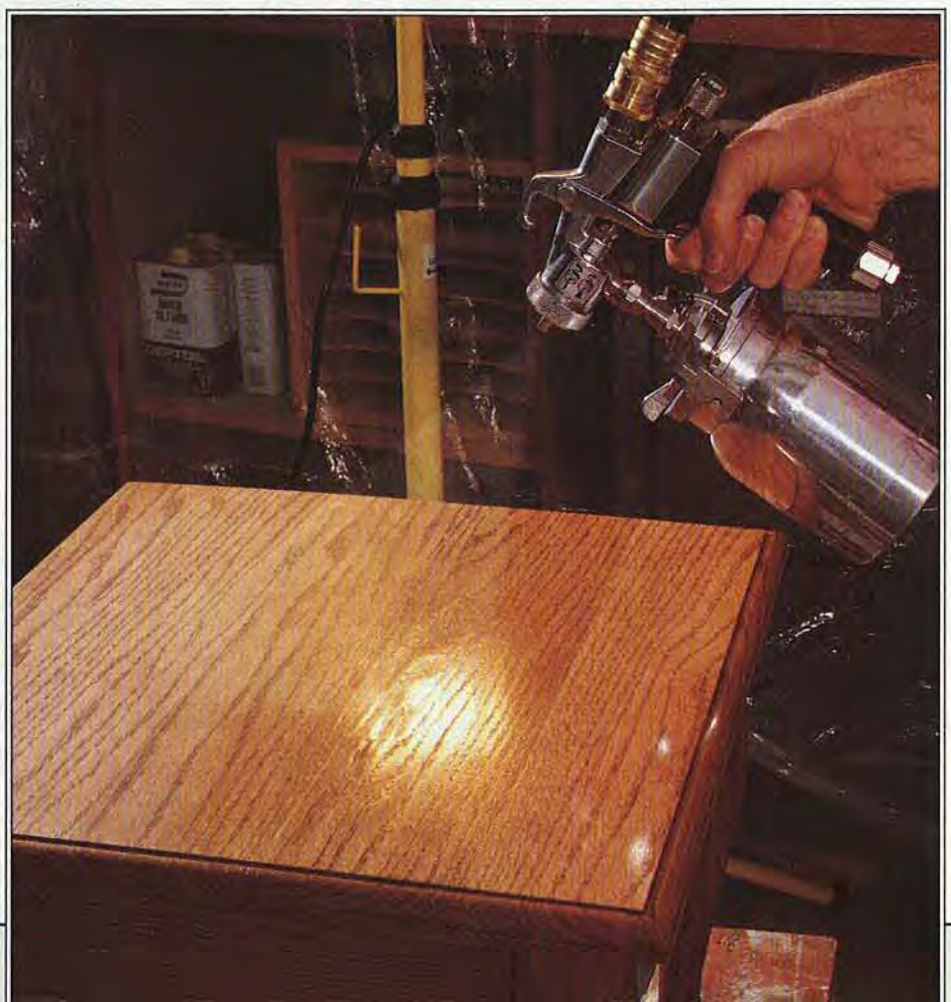
The importance of gun cleanup. When spraying water-based finishes with an HVLP system, the finish can dry out inside the nozzle of the gun within minutes after you stop spraying. Once these finishes dry, no solvent will remove them. You'll have to scrape them out, and this can take hours. To prevent this problem, be sure to clean your gun and its parts immediately after you finish spraying.

STEP 3 SET UP YOUR SHOP FOR SPRAYING

Finishing wood is 90 percent preparation and 10 percent application, and that holds true with HVLP systems and water-based finishes. Here are the things you need to do to your shop before turning on the spray gun.

Light to see the work. With your work light in the correct position, you'll be able to see the thickness of the finish you're applying and any flaws such as sags or runs. The secret lies in positioning yourself and your light so that you can see the light's reflection in the finish on the workpiece. Set up your light as shown in the photo at *right*, and spray a few test pieces to make sure you can see the results clearly.

Guard against overspray. Even though HVLP systems greatly reduce overspray, you should still plan to control it. Cover your tools and work-



▸ **Position yourself and the work light so that you can see the reflection of the light in the sprayed surface.**

STEP 4

Successful spray-finishing requires a lot of small, but simple adjustments at this stage. You may need to thin the finish and tweak the settings on the gun until you get a perfectly even flow.

Thin and strain the finish. Although most manufacturers of water-based finishes don't recommend thinning these products more than five percent, you may want to thin other finishes such as polyurethanes or paints. You'll find directions for thinning on the labels of most finishes.

You must, however, strain any finish you spray to get rid of lumps or contaminants, as shown at *right*. Most hardware stores sell

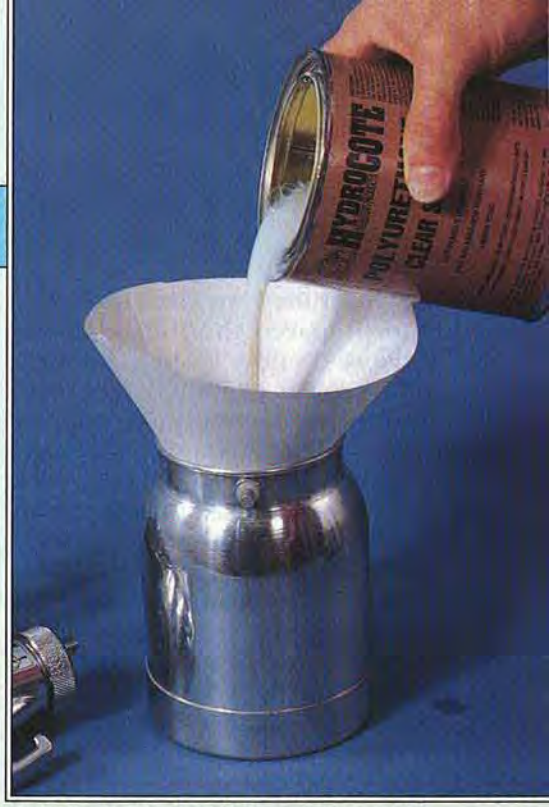
PREPARE THE GUN AND FINISH

disposable paper strainers you can use for this purpose.

Select a pattern. The air horns on the front nozzle of a spray gun enable you to adjust the shape of your spray pattern. Turn the horns horizontal for a vertical pattern, or vertical for a horizontal pattern. Set the horns at 45° for a circular pattern. Test your spray pattern on a piece of scrapwood until you get the desired shape. Use a vertical pattern for spraying panels, a horizontal pattern for narrow vertical workpieces, and a round pattern for round or circular objects. For most HVLP spray guns, keep the nozzle about 6-10" from the workpiece to obtain the best results.

Adjust the fluid-to-air ratio. The next step is to adjust your finish flow to get the proper amount of finish on the work surface. You increase or decrease the amount of finish by turning a knurled knob located at the rear of the gun just above the handle.

Start with the fluid control set at the minimum and increase the amount of fluid until the finish on your test piece starts to run or sag. Then, reduce the amount of fluid until the runs stop. If you get a surface that has a texture similar to that of an orange-peel, you need more finish.



▲ Strain the finish through a disposable filter available at hardware stores.

benches with drop cloths, or hang an old shower curtain or other barrier around your work to avoid spraying the walls.

Nix the dust for top results. Fast-drying sprayed finishes don't collect dust like brushed-on finishes, but you should minimize airborne dust anyway. Clean and vacuum the area thoroughly. Turn off all fans including the heating or air conditioning. You also may want to mop the floor with water to keep down static electricity which attracts dust. Turbine-based HVLP units draw in a lot of air, and this may stir up dust.

Wear a respirator and goggles. Water-based finishes impart very little odor, but avoid inhaling the mist from the spray gun. When spraying, wear a snug-fitting respirator with a replaceable organic-vapor cartridge. Replace the filter when you can smell odors through the respirator. Cotton dust masks won't suffice because they don't neutralize organic vapors.

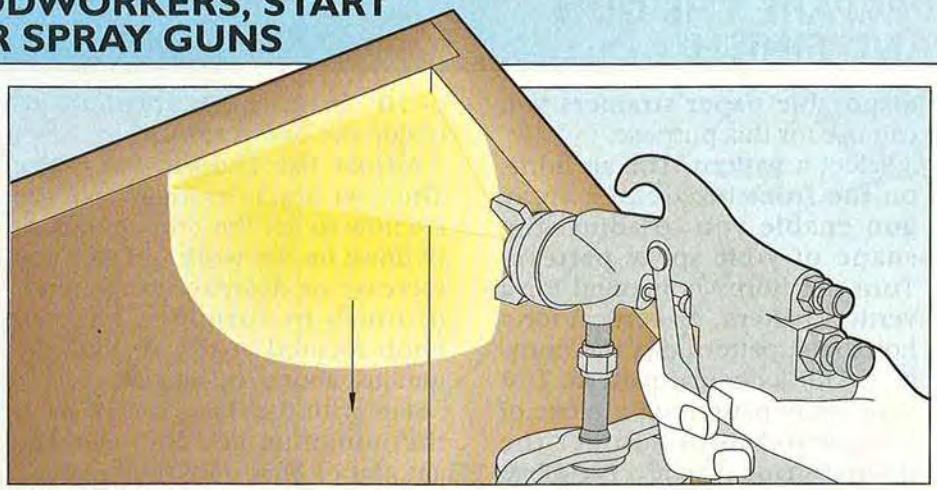
▲ Turning the air horns on the front of the spray gun enables you to change the shape of your spray pattern.

▼ Adjust the fluid control knob at the rear of the gun until you get the proper amount of finish on a test panel.

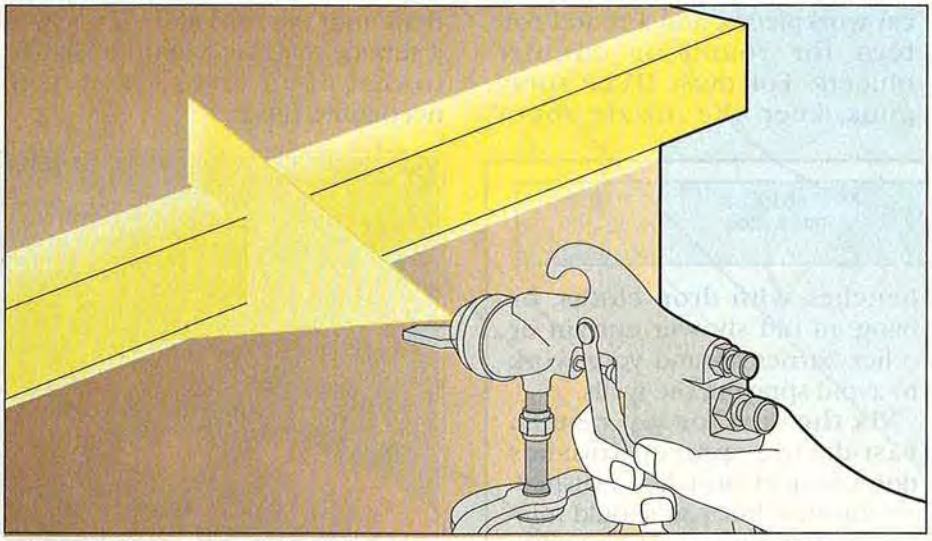
STEP 5 WOODWORKERS, START YOUR SPRAY GUNS

Having tuned up the equipment and prepared the finish, all you have to do now is spray the parts of a project in the correct order and maneuver the gun properly. Start your spraying on the edges and corners, saving the large areas and panels for last. On enclosed structures like boxes and drawers, spray the insides first.

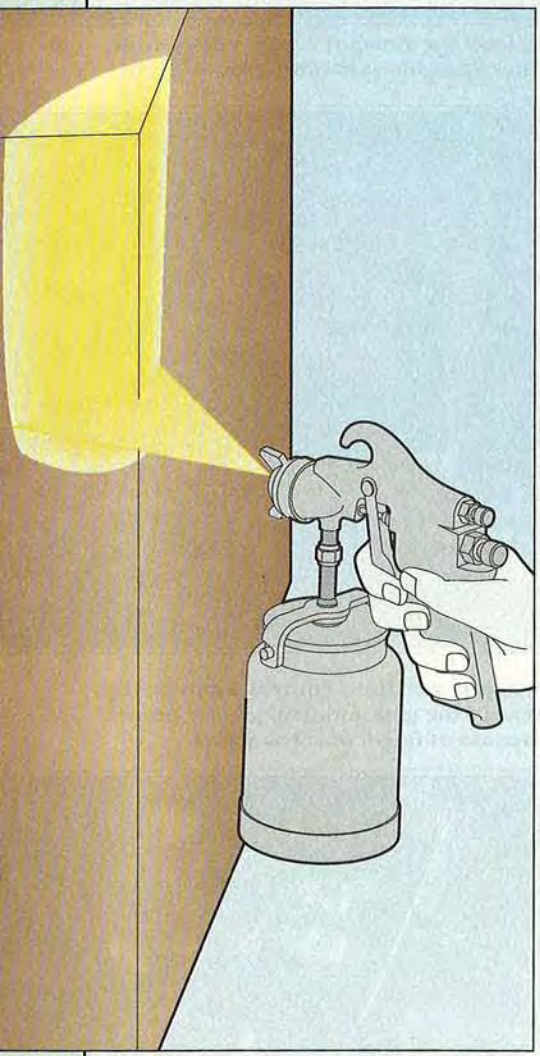
To avoid the natural tendency to pivot the gun from the wrist or elbow, move your arm from the shoulder. And be sure to maintain a constant speed with the gun.



INSIDE CORNERS. Spray down each side with a small overlap in the corner.

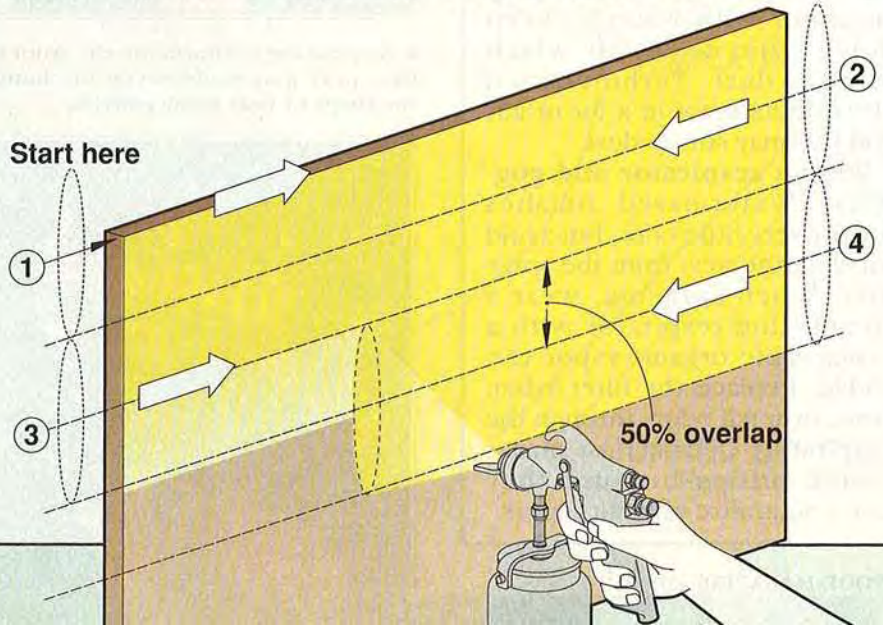


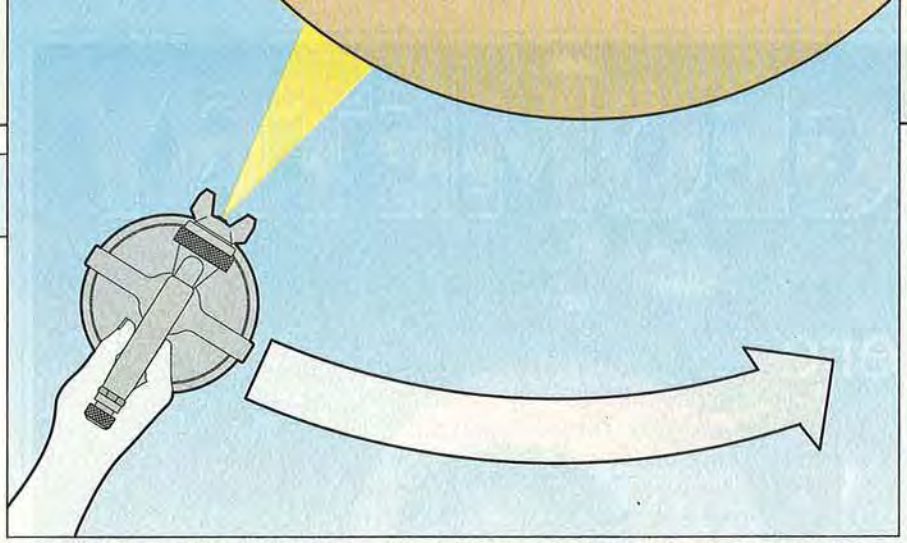
EDGES. Aim so that the center of the spray pattern hits the center of the edge.



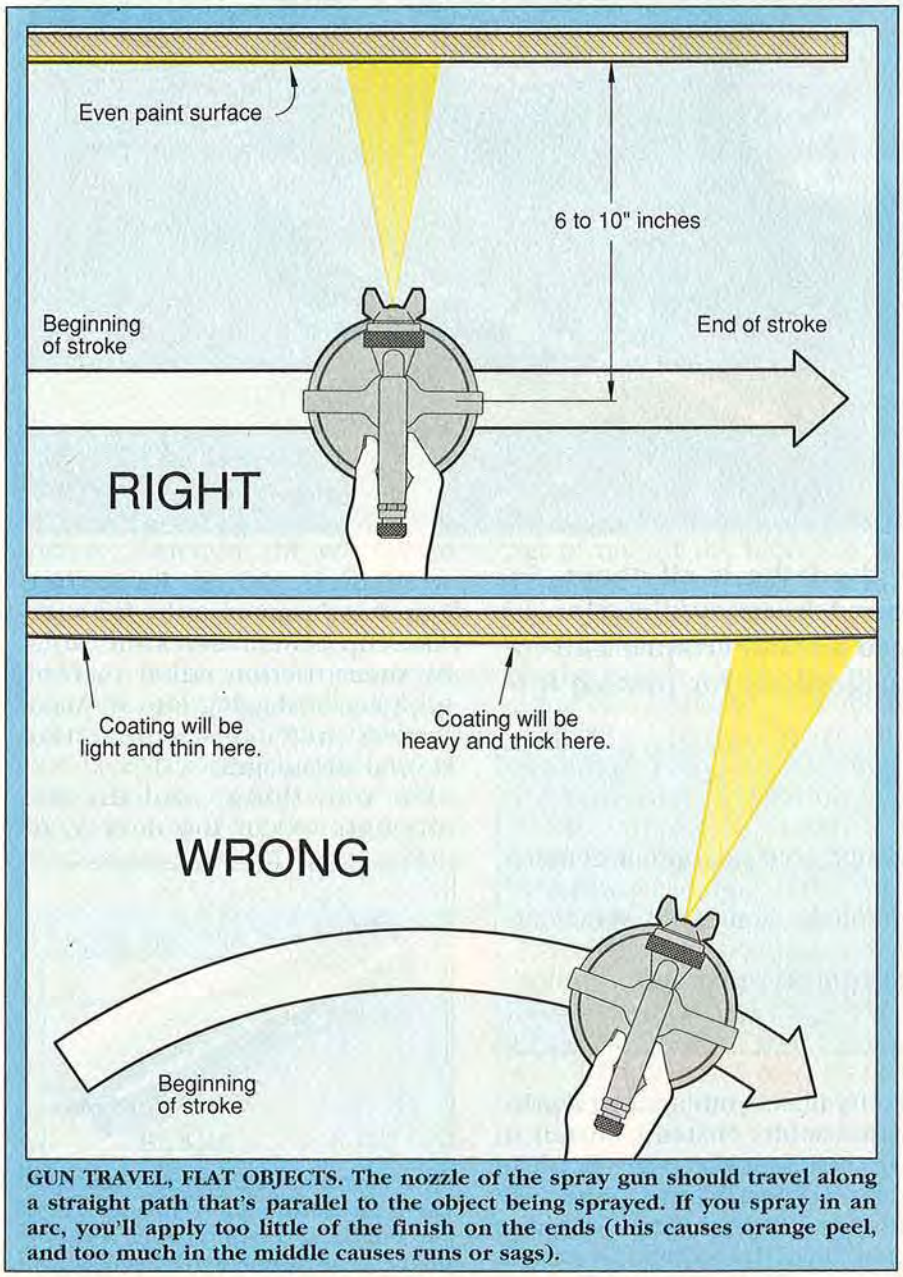
OUTSIDE CORNERS. Aim the spray gun so the corner splits the spray pattern down the middle.

PANELS. Start by triggering the gun before the spray pattern hits the workpiece. Do not let go of the trigger until the spray pattern has completely left the workpiece. Overlap each spray pattern 50 percent, and work in a back-and-forth motion.





GUN TRAVEL, ROUND OBJECTS. Keep the gun equidistant from the project during the entire spraying motion. If you can't maneuver around your project easily, mount it on a lazy Susan. That way, you can rotate the project 360°.



GUN TRAVEL, FLAT OBJECTS. The nozzle of the spray gun should travel along a straight path that's parallel to the object being sprayed. If you spray in an arc, you'll apply too little of the finish on the ends (this causes orange peel, and too much in the middle causes runs or sags).

Tips on spraying other products with HVLP

HVLP systems work for more than just water-based finishes. Here are the other options available.

Paint. You can spray oil- or latex-based paint with most HVLP systems, but you may have to thin the paint anywhere from 10 to 30 percent to achieve smooth results. Follow manufacturers' recommendations on thinning, and spray a few test panels before applying paint to a project. If thinning doesn't work, you can buy accessory air nozzles for spraying thick finishes.

Oil-based polyurethanes. Oil-based polyurethanes usually require thinning. But unless you have an extensive ventilation system with an explosion-proof fan, you must spray these oil- or solvent-based products outside in a spark-free environment.

Lacquer. Because of its quick-drying nature, lacquer usually does poorly in an HVLP spray system. The warm, turbine-driven air causes the lacquer to dry prematurely, leading to an orange-peel texture. With their cooler air delivery, however, CAS systems do a good job with lacquers. Like oil-based products, lacquer requires extensive ventilation precautions due to its toxic and flammable fumes.

Where to get HVLP equipment

Turbine-based systems:

Campbell Hausfeld, 800/543-8622

Turbine and CAS

Accuspray Inc., 800/618-6860
Apollo Sprayers, 800/578-7606
Graco/Croix, 800/367-4023
Wagner Spray Tech Corp., 800/328-8251

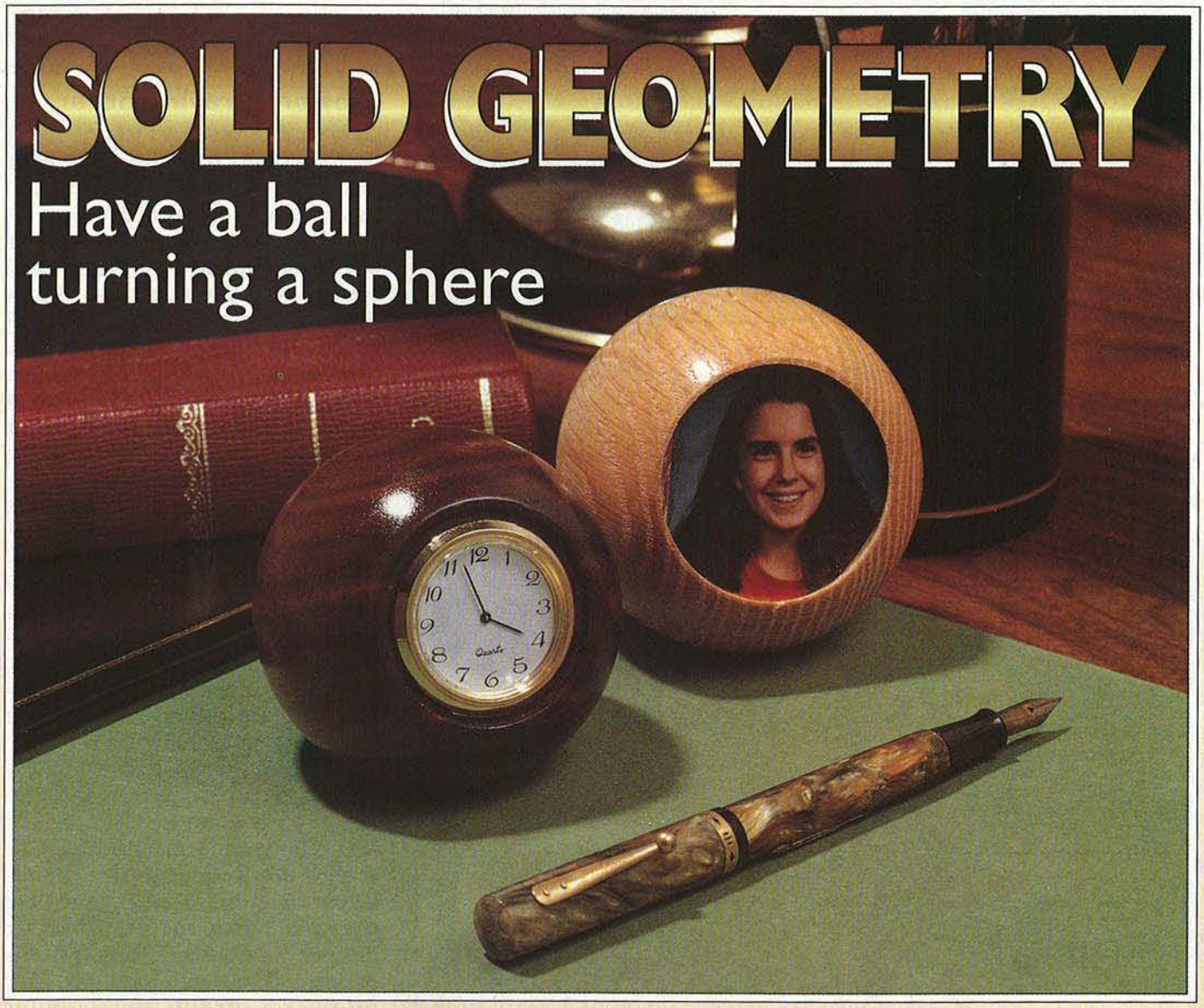
CAS spray guns

Binks Mfg. Corp., 708/671-3000
De Vilbiss, 800/338-4448

Written by Tom Jackson
Photographs: John Hetherington
Illustrations: Kim Downing

SOLID GEOMETRY

Have a ball turning a sphere



Making round items. That's what the lathe is all about. So, why not turn something that's round in every direction—a sphere? And, in case you don't need a small croquet ball (or big billiard ball), we have some suggestions for putting it to practical use.

Project Prep

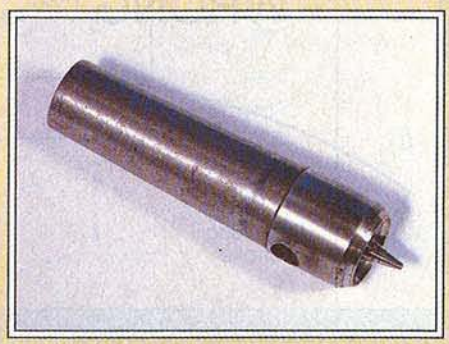
Stock: 3×3×4½" hardwood
Lathe equipment: Drive center (see text), revolving tail center, chuck (optional), 3-4" faceplate
Tools: ¾" roughing gouge, ½" and ¼" spindle gouges, 1" skew, ½" skew, diamond parting tool
Lathe speeds: Roughing, 500-1,000 rpm; turning and sanding, 1,000-1,500 rpm

Friction: the driving force

This project starts with a little between-centers turning. That provides the perfect opportunity to try a spindle-mounting method that many pros swear by.

To try it, set your spur-type drive center aside. Instead, install in your headstock a cup-type dead (non-revolving) center—the type shown *right* that manufacturers often furnish as the tail center with their lathes. Put a live (revolving) center in the tailstock. The cup center drives the stock by sheer friction rather than by gripping or digging into it. Many turners prefer this setup, citing several advantages:

For one thing, tool dig-ins, attempts to cut too deeply, or



Often furnished with a lathe for use in the tailstock, a cup-type dead center offers advantages as a drive center.

Print this article

other turning flubs are less likely to damage the turning or hurt the turner. In case of a snag, the workpiece simply stops spinning. (If the piece stops *too* easily, simply tighten the tailstock to exert more force on the turning and increase the friction.)

Also, it's easier to mount and dismount the work. You don't have to cut kerfs for the center's spurs, nor do you need to drive the stock onto the center with a mallet. And when you must dismount, then remount, a turning, recentering it is a snap.

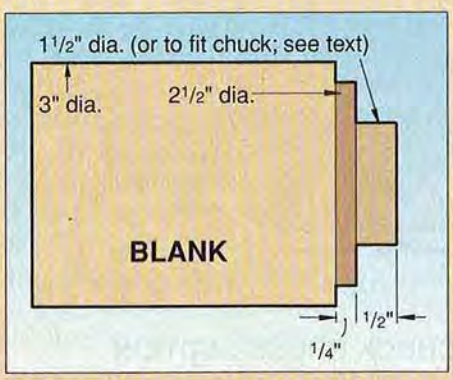
First, turn the blank

Locate and mark the center on each end of a 3×3×4½" piece of walnut, oak, or other turning stock. Mount it between centers.

With a roughing gouge or large bowl gouge, round the stock down to 3" diameter. True and smooth the cylinder with a skew. On one end, form a tenon to fit your lathe chuck. (We cut the tenon on the tailstock end.) If you don't have a chuck, turn a 1½"-diameter tenon ½" long. In the ¼" adjacent to the chuck tenon, reduce the diameter to 2½", shown in the Blank illustration, *below*. Dismount the workpiece, and remove the drive center.

Install your lathe chuck, and mount the blank. If you don't have a chuck, make a jam chuck for your 3-4" lathe faceplate. Here's how. First, trace around the faceplate onto a piece of 1"-thick stock. Bandsaw the disc, then attach it to the faceplate with screws. Mount the faceplate on the lathe, and turn the edge and face of the wooden disc true. With the small gouge, bore a 1½" hole ½" deep into the center. The tenon on your blank must plug snugly into the hole, so test the fit frequently as you work.

To mount the blank securely, glue the tenon into the hole. For a no-wait start, mount the piece with cyanoacrylate (CA) adhesive.



Hew out a hemisphere

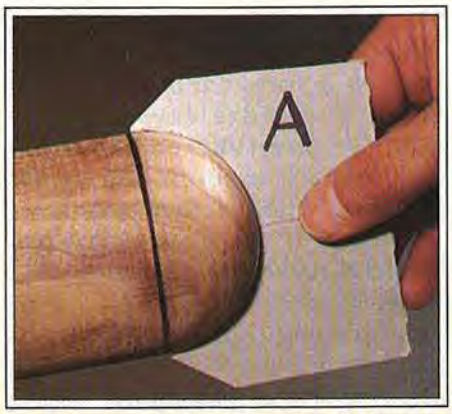
True the end of the cylinder, cutting back far enough to eliminate any marks left by the center. Draw a line around the cylinder about 1½" from the unchucked end. To do this, just hold the pencil point against the turning with the lathe running.

Measure the turning's diameter at the line. Set your compass or divider to one-half that measurement. Now, draw diagonal lines on a piece of cardboard or stiff paper at least 4×4" to make your sphere templates.

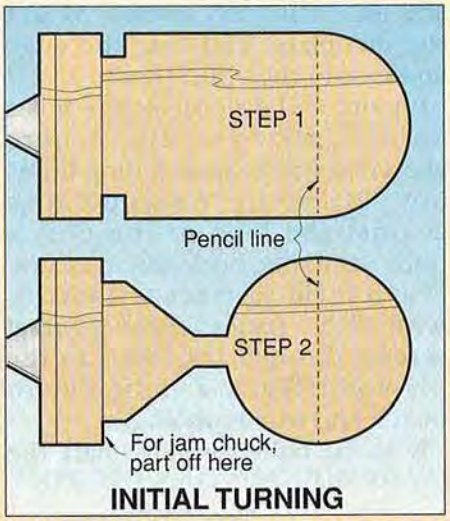
At the center of the cardboard—where the diagonals cross—swing a circle with the compass. With scissors or a knife, cut the cardboard in half along one of the diagonals, then cut the semicircle out of one of the halves to make Template A, shown in the photo *above right*. (We trimmed ours to a rectangle to make it easier to handle.) Place it over the turning at the line; it should fit perfectly.

Cut the semicircle from the other half. Trim where shown on the Templates illustration in the *WOOD PATTERNS™* insert in the center of the magazine to make Template B. Set one of the cut-out semicircles aside as Template C.

Starting from the line, form a rounded end on the turning. Rough the curve to shape with a gouge, checking it frequently with Template A. The ends of the template should meet the circumferential line, as shown *above right*. If they fall behind the line (that is, toward the headstock from it), draw a new line where indicated by the template. Smooth the curve with a skew, and sand with 150- and 220-grit paper. Don't sand away the line, though. Your turning should now look like a blunt bullet (Step 1, Initial Turning drawing, *above*).



As you turn the end, gauge the curvature with Template A. If the ends of the template don't meet the pencil line, you'll end up with an elongated sphere.



Make it into a ball

Now, starting from the line and working back toward the headstock, rough in a matching curve. Cut a supporting tenon about ⅜" diameter, shown in Step 2. Using Template B, shape as much of the back of the sphere as you can.

As before, rough the shape with a gouge, then refine it with a skew. Be careful not to flatten the sphere in the hard-to-reach area near the supporting tenon; it's better to leave it slightly elongated there, for now.

Continued

Your turning should now look somewhat like a trailer-hitch ball. Sand as before; except this time, you can sand away the line. Remove the turning from the chuck. If you used the jam chuck, part it off where shown.

Build a new chuck

Now, construct a chuck to complete turning the sphere. Start by bandsawing a 4¼" disc from 1½"-thick scrapwood (a chunk of 2×6 would do) and another one from ½" plywood. Center your faceplate on back of the thick piece, which will be the chuck body, and attach it with screws. Mount the faceplate, and true the edge and face of the chuck body.

Lay out and drill the screw holes on the plywood disc where shown in the Retaining Ring drawing. Place the plywood disc against the face of the chuck body, aligning both discs' edges. Fasten them together temporarily with #8×1" panhead sheet metal screws through the holes in the plywood. Take a light cut to match and true both edges.

With the lathe running, mark the center of the plywood disc. Scribe a 2¾" circle (1⅜" radius) around the center. With the parting tool, cut just inside the scribed circle to remove the center of the plywood. Angle the tool handle away from you to undercut the inside edge of the ring, shown in the Spherical Chuck Cross-section drawing. Make an orientation mark across the ring and chuck body, then remove the ring.

Next, turn a recess in the chuck body. Mark your ¼" spindle gouge about 1¼" from the tip, then bore straight in to that depth at the center of the chuck body. With the larger gouge, hollow out the tapered recess. Template C will help you shape the recess side properly. Note, however, that the recess isn't a full hemisphere, so the top edge of the template won't be flush with the face of the chuck body. For a secure grip, deepen the center of the recess, allowing the sphere to wedge against the side.

Check the retaining ring's fit on the turning. With the bevel facing down, the ring should slide onto the sphere far enough to expose about ⅓ of it above the ring, shown in the cross-section. If it doesn't, remount the ring on the chuck body and carefully enlarge the opening. Gauging it with Template C can help you judge how much to cut away.

One more round

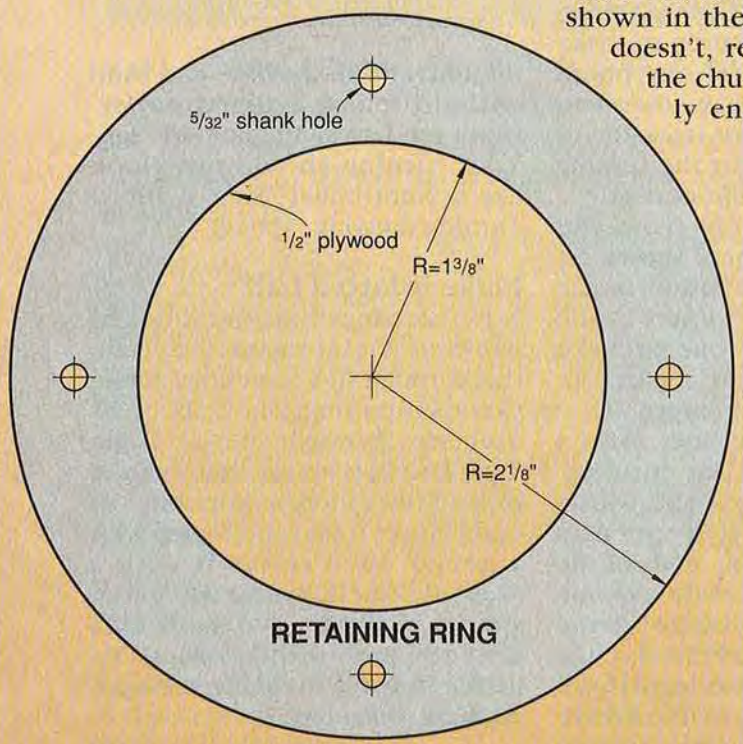
Slide the retaining ring over the stem on the bottom of the turning, then place the top of the turning into the chuck recess. Start the screws to secure the retaining ring, but don't tighten them. Slide the tailstock up, and position the stem center on the point of the tail center, as shown *opposite page, top*. Tighten the tail center, then the retaining ring.

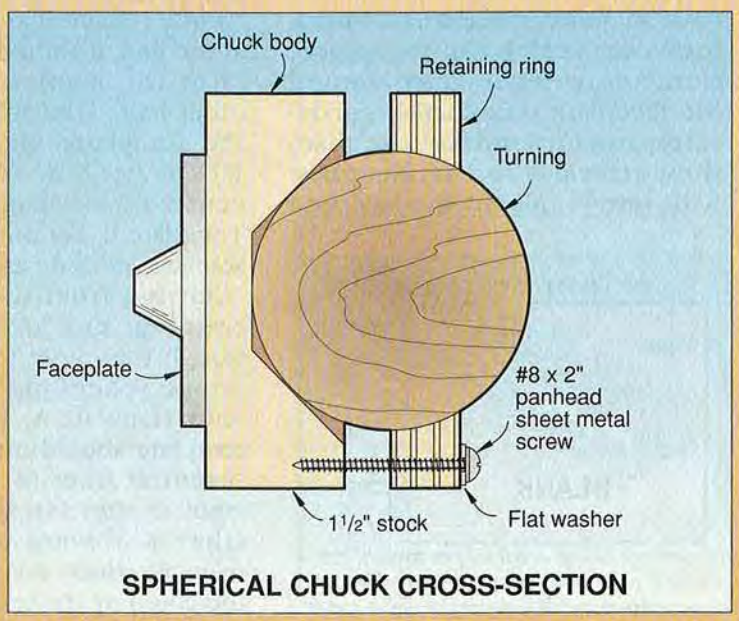
Keeping the tailstock in position, part off the stem. Then, slide the tailstock out of the way to shape the bottom of the sphere. Take light cuts, and check the contour with your templates as you clean up the bottom. (You may have to fold or trim a template to clear the chuck's retaining ring.) Sand.

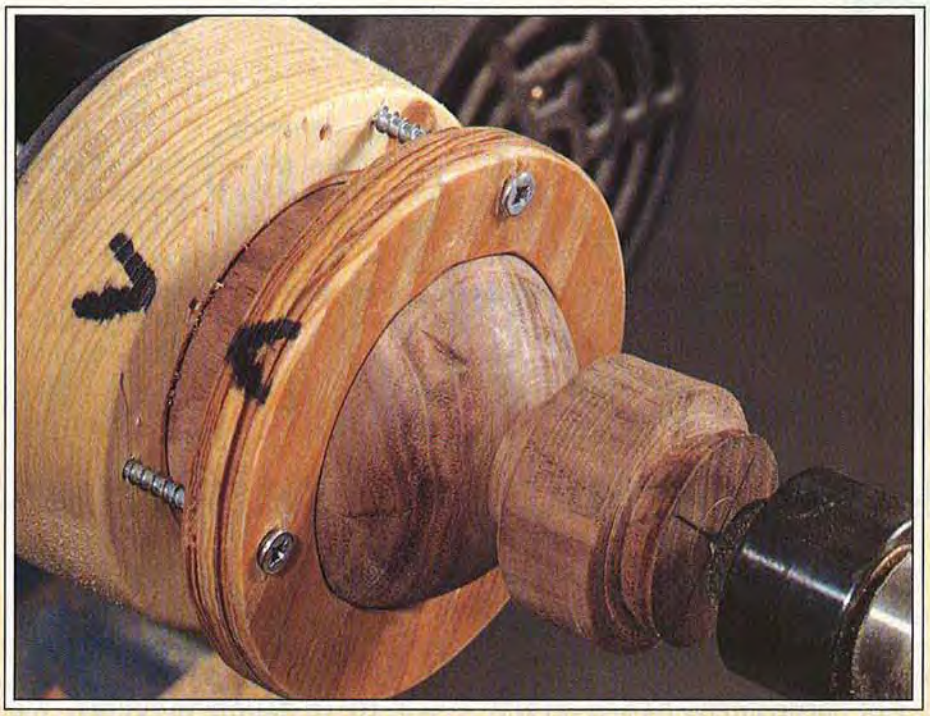
All-round desk accessories

To make either the clock or the picture-frame paperweight, just turn flat spots on the sphere. That's easy to do with the spherical chuck. Here's the procedure for the picture paperweight.

First, form the picture opening. You can cut it into the end grain, on a face parallel to the end grain,







Tighten the retaining ring's screws securely. Take light cuts to prevent knocking the turning out of position in the chuck.

on a face perpendicular to the end grain, or at an angle to any one of those. Assuming you haven't moved the sphere in the chuck since lining up on the stem, it's now in position for cutting directly into the end grain. That's a good choice for a start.

Position the tool rest parallel to the face of the chuck. With a gouge, form a flat spot about 2" in diameter on the sphere. Then, cut in about 3/16" deep, creating a flat-bottomed hole. Take light, careful cuts. Snags at this point can alter the sphere's position in the chuck, which could spoil the surface. Undercut the inside edge slightly, as shown in the Paperweight Section View drawing, *far right center*. (We used a ½" skew.)

Now, position the faceplate so the sphere's grain runs either straight up and down or straight across when seen from the front—your choice. Loosen the retaining ring on the chuck slightly, then rotate the sphere into position to turn the base surface.

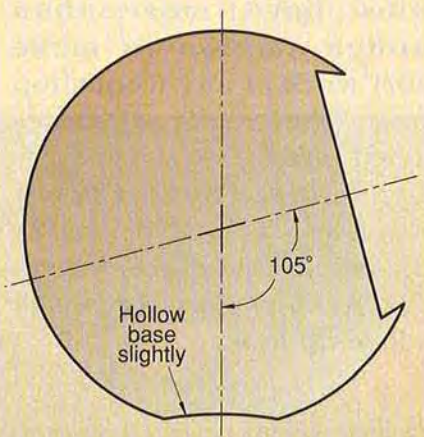
First, rotate the picture opening 90° upward. (It will now be pointing straight up at your shop ceiling.) Make a mark where the tail center points to the sphere. Then, rotate the sphere 15° more. To approximate 15° of rotation on a 3" sphere, move the center mark 25/64" beyond the tail center. (We measured the rotation with a divider, shown *below*.) Tighten the retaining ring.

With a small gouge, turn the base surface 1" in diameter. For a steadier sphere, make the base surface slightly concave. Sand the turning, then apply your favorite finish. Cut the photo to the larger diameter of the picture opening, then snap it into place.

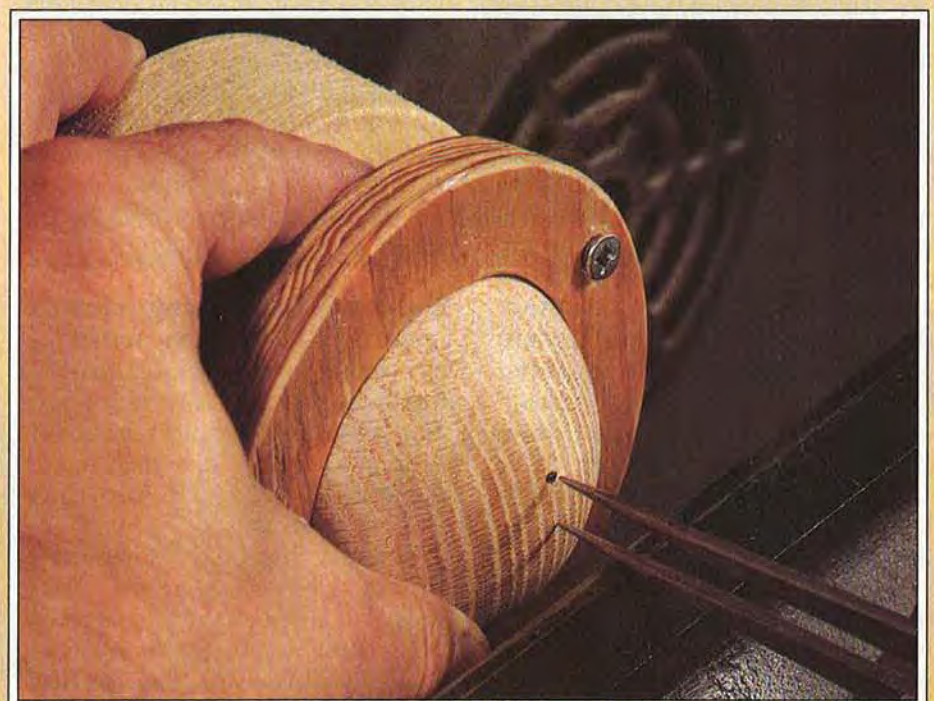
For the clock version, turn the first recessed surface slightly larger than the clock insert's outside diameter. Then, turn a recess inside that to fit the insert back. Complete the base and finishing as with the photo paperweight.

Buying guide

Clock. Quartz insert, 1 7/16" diameter, item no. 200110, $13.60 ppd. in U.S., Schlabaugh and Sons, 720 14th St., Kalona, IA 52247, or 800/346-9663 to order.



PAPERWEIGHT SECTION VIEW



Divider leg shows the new reference point when rotating the sphere into position to form the base. Set the dividers to 25/64" to turn the sphere about 15°.

Illustrations: Roxanne LeMoine Photographs: John Hetherington

SHOP VACUUMS

The do-it-all shop cleanup champions

As we discovered in our tests, all of today's shop vacuums have more than enough suction to make short work of any woodshop mess. What really separates them, however, is how much noise they produce and how well they filter dust-laden air before returning it to your shop. Let's take a close-up look.

Since we last reported on shop vacuums in December 1988, the marketplace has changed considerably. The long-time shop-vacuum manufacturers—Shop-Vac, Sears Craftsman, and Genie—are still cranking out vacs, but now they have lots of new competition. Companies that have carved out niches in the home-vacuum market—Hoover, Eureka, and Dirt Devil—recently have joined the shop-vacuum fray. And, these well-established upstarts are giving the long-time shop-vacuum brands a run for your debris-cleaning buck. Also, more power-tool companies than ever now offer shop vacuums to complement their lines of woodworking machines.

To your advantage, many of these new players have come out with innovative features not seen before in the shop-vacuum market. They include detachable blowers, separate tanks for dry debris and liquids, and circuitry that turns your vacuum on and off when you switch a power tool on or off.

Not surprisingly, having all the new brands and features available makes your buying decision more complex than ever. To help you out, we put 22 shop vacuums through an exhaustive testing procedure, which we elaborate on later in this article. We'll closely examine those test results, and point out what features you need to look for.

Note: *Shop-vacuum manufacturers such as Genie, Sears Craftsman, Shop-Vac, and Wap make a wide array of models. Since we can't do justice to every machine made within the confines of this article, we concentrated on popular models best suited to home woodworkers. For more information on other products, contact the manufacturers through the phone numbers on* page 61.

You have four categories of vacuums to choose from

The chart on *pages 60 and 61* details our findings on each tested shop vacuum. To help you decide what model best suits your needs, we divided the chart into these four categories:

- **Vacuums that hold 28 gallons of debris.** These big boys of the shop-vacuum market typically have fiberboard drums suitable only for holding dry debris. Although they don't easily move to other areas of your home, their large capacity makes them ideal for hooking up to prolific sawdust producers such as thickness planers, tablesaws, or router tables.
- **10- to 16-gallon vacuums.** We consider these models the heart of the shop-vacuum market because of their versatility. You can hook them up to dust-producing machinery, move them from place to place with ease, and clean most any surface—wet or dry. Look here if you can afford just one vacuum.
- **Vacuums under 10 gallons.** Most of these are similarly constructed, down-scaled versions of the 10- to 16-gallon vacs. They're less expensive and easier to transport, but fill up in no time when you're cleaning up wood chips.
- **Fine-particulate vacuums.** These are the only tested machines that filter dust down to 1 micron in size. They're expensive, but built with few compromises in quality or performance.

28-GALLON VACUUMS

RYOBI
Model IDV28

DELTA
Model 49-255

Print this article

What you need to know to interpret the test results

Although the information in the chart on *pages 60 and 61* speaks for itself, keep these points in mind as you evaluate the various shop vacuums:

• **Suction.** Most manufacturers use peak-horsepower ratings to proclaim the cleaning power of shop vacuums. But as we found out in our tests, these figures have little to do with a machine's actual performance. For example, several tested vacs with less than two peak horsepower actually outperformed machines touting as much as five peak horsepower.

To find out how much suction power the vacuums really have, we performed two tests. First, we sucked up five gallons of sawdust with each machine three times and averaged the seconds required for this task. Surprisingly, the most expensive and powerful vacuums in the test were only a few seconds faster than the least-expensive machines.

We also tested the lifting power of the vacs by measuring how many inches each of them would pull water up a clear tube. Here we found that the machines with powerful motors, efficiently designed fans, and rubber-gasket-sealed tanks performed much better. Look for a machine with a high water-lift figure if you frequently use a shop vacuum to clean up heavy objects such as metal debris or wood scraps, or need to quickly clean up liquids.

• **Noise level** Manufacturers tell us that many consumer equate loud noise with power when it comes to shop vacuums. But as we found out, noise has nothing to do with power. Some of the most powerful vacs in our test were also the quietest.

Rather than list the vacuums' decibel readings, which can be confusing, we paid attention instead to the high pitch or "whine" of a shop vacuum, relying on our ears to determine the noise-level ratings. Simply put, the machines with "excellent" ratings proved comfortable on our ears. The machines with "poor" ratings produced a loud, shrill noise that often left our ears ringing. The "good" and "fair" machines fell somewhere in between.

If you already own a vacuum that's too noisy, you might be interested in an inexpensive muffler that we found out about during our research. The model shown *below* is made by Beam Industries, 1700 W. Second St., Webster City, IA 50595. Call 515/832-4620. The unit is specifi-

Continued

The Beam muffler tones down the roar of any shop vacuum.

16-GALLON VACUUMS

ROYAL DIRT DEVIL
Model 081600

SHOP-VAC
Model QSP 9000

GENIE
Model 3000

SEARS CRAFTSMAN
Model 17700

HOOVER
Model S6755

SHOP VACUUMS

Shop vacuums and dust collectors: how they differ

Ideally, a woodworking shop should have a dust collector *and* a shop vacuum for debris-collection tasks. But, if you can't afford both machines, a vac will prove itself the more versatile of the two until the day you can spring for a dust collector. Here's why.

Dust collectors are designed to move high volumes of air through large-diameter ducting (3" and above). That's why heavy-duty tablesaws, sanders, thickness planers, and the like have 3" or 4" dust-collection ports specifically designed for connection to a dust collector. The reason: these machines produce large volumes of dust and chips that can be efficiently carried away only by large volumes of air. Nearly all dust collectors have relatively quiet induction motors rated for continual use.

On the other hand, shop vacuums move smaller volumes of air, but have more lifting power in small-diameter ducting and hoses. They work best for collecting debris from portable power tools and benchtop machines with 2½"-and-smaller dust ports, and for general cleanup around the shop. Some stationary tools that produce smaller levels of debris, such as bandsaws, also work well with vacuums.

The Jet JV10 has a cloth tank liner and pleated paper filter for effective dust separation and easy debris disposal.

A disposable bag makes for fast and convenient cleanup, and prevents a paper-over-foam filter from clogging quickly.

cally made for central vacuum systems with 2"-diameter connections. So, we wrapped masking tape around one elbow end to make it fit the 2½" exhaust ports on most of our tested units. You can buy the muffler for under $10 at Beam dealers nationwide or directly from the company.

In our tests, this muffler decreased the noise level of all the vacs. It made the noisiest machines tolerable, and improved their rating about one grade (from "poor" to "fair"). It had no effect on the suction of the vacuums. Our contacts at Beam tell us they are working on a muffler that's even more effective and sells for about $30. It should be available by the time you read this article.

• **Filters.** As you can see in the chart, most shop vacuums come with a pleated paper filter or foam filter covered by a paper or cloth bag. We found that the pleated-paper filters did not clog as quickly because they have much more surface area than the paper- or cloth-over-foam filters. Of all the pleated filters, the Sears version had the most square footage, measuring 7½" wide and 18' long when we straightened it out. Most pleated filters cost upwards of $10 each but you can clean and reuse them for years under normal use.

Some models combine the filter with a cloth tank liner as shown *above right*, or a disposable bag as

10-GALLON VACUUMS with metal tanks

MAKITA
Model XSV-10

BOSCH
Model 1702

JET
Model JV10

MILWAUKEE
Model 8955

SHOP-VAC
Model 610-50

shown *opposite page, middle*. We found that the tank liners helped keep the filters from clogging and that we could shake them clean without putting a cloud of dust into the air.

Disposable bags provide the most convenience, but at a price. Shop-Vac has the cheapest disposable bags (3 for $10), while Wap and Fein disposables run up to $7 each. Besides making for clean and easy disposal of debris, these bags act as effective pre-filters. With one in place, little dirt reaches the filter, nearly eliminating filter cleanings. We found the disposable bags ideal for collecting fine dust, but we also found it most economical to leave them out of the machines when collecting large quantities of debris.

To test the filters for effectiveness, we drew super-fine red chalk dust through the filter mediums of each vac (including the disposable bags for those machines that come with one). Any dust getting through the filters was deposited onto a tissue that we visually inspected for traces of the red dust. The machines that rated "excellent" passed none of this dust through the filters. Even the filters that rated "good" and "fair" captured most of this fine dust, but you should wear an approved respirator or dust mask to completely shield your lungs while cleaning with these vacuums.

•**Tanks.** Our tested vacuums vary greatly in the size, shape, and material of their tanks. All in all, we prefer plastic tanks for their light weight and low cost. Although the stainless-steel tanks look impressive, they weigh a lot, can't be easily repaired if they dent, and add significantly to the cost of the vacuum.

However, as noted in the chart, we found some of the plastic tanks hard to empty because of their tapered shape or molded-in nooks and crannies that tend to trap dust.

More points to consider

None of the features *below* will make the difference between a so-so vac and a great one all by themselves. But, added together, they make a big impact on how effectively a vac performs.

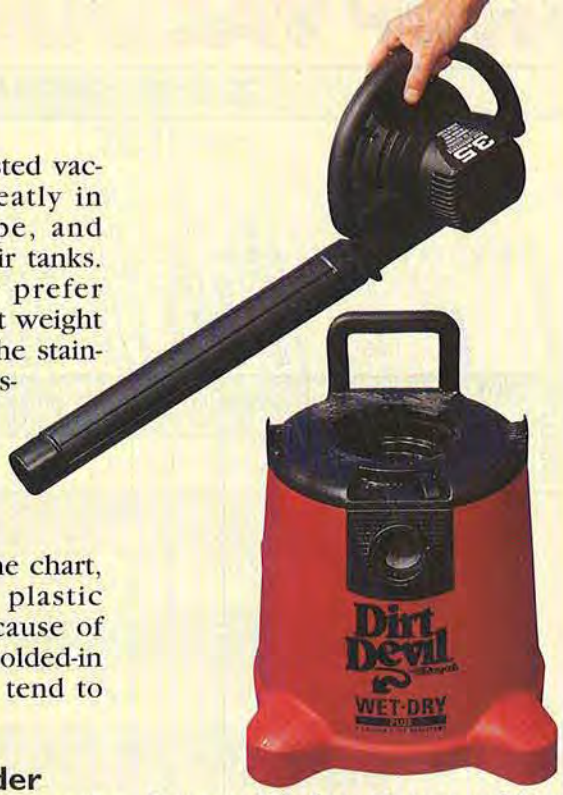
•**Cord length.** Some manufacturers save on costs by outfitting a shop vacuum with a short power cord. This may shave a few bucks off the machine's price, but you'll "pay" again and again by frequently reaching for an extension cord.

•**Hose size.** Many of the tested machines come with only 1¼" or 1½" hoses. These work okay for fine dust or water pickup, but you'll spend at least $10 for a 2½" hose for collecting wood chips.

•**Accessories.** Here's another place manufacturers often trim their costs—by including fewer accessories than the competition. Look for a machine that comes with the accessories you'll use most often.

•**Blowing capability.** About half of the machines in our test have an exhaust-air port that you can hook a hose to for blowing away debris. Two manufacturers—Hoover and Royal Dirt Devil—go one step further with a motor-and-fan housing that you can remove from the vacuum. With this innovation, you can leave the tank behind and use the machine as a handheld blower as shown in the photo *above*.

Continued on page 61



Some models from Hoover and Royal Dirt Devil have detachable, handheld blowers.

11-GALLON-OR-LESS VACUUMS

with plastic tanks

EUREKA Model 2827

SEARS CRAFTSMAN Model 17701

ROYAL DIRT DEVIL Model 08900

FINE-PARTICULATE VACUUMS

FEIN Model 42989

WAP Model ST20

WAP Model SQ14

SHOP VACUUMS

22 SHOP VACUUMS: WE PUT 'EM TO THE TEST

CATEGORY	BRAND	MODEL	MOTOR			WET/DRY PICKUP	TANK				FILTER SYSTEM			PERFORMANCE EVALUATION (8)									OVERALL RATING (9)	
			PEAK HORSEPOWER	AMPERAGE	FILTER CHANGE NECESSARY (1)	DRAIN PLUG (YES, NO)	TYPE (2)	LISTED CAPACITY (GALLONS UNLESS NOTED OTHERWISE)	CAPACITY WITH FILTERS IN PLACE	RUBBER SEALED (YES, NO)	TYPE (3)	DISPOSABLE BAGS (YES, NO) (4)	FILTER-CLEANING METHOD (5)	WITH CLEAN FILTER	SAWDUST PICKUP (6) WITH DIRTY FILTER	FILTER EFFECTIVENESS	WATER LIFT (7)	NOISE LEVEL	EASE OF EMPTYING DRUM	TENDENCY TO TIP WHEN PULLED OVER EXTENSION CORD	PORTABILITY	LID LOCKS (QUALITY AND EFFECTIVENESS)	PERFORMANCE	VALUE
MORE THAN 25 GALLONS	DELTA	49-255	1	7.5	DRY ONLY		D	28	26	N	CF, PC	N	C	15.5	18.5	F	58	G	F	F	P	G	8.5	8
	RYOBI	IDV28	2	9	DRY ONLY		D	28	26	N	CF, F	N	D	9	10.5	F	58	G	F	F	P	G	8	9
10-16 GALLONS	BOSCH	1702	2.5	9	C	N	B	10	6	N	CL, F	N*	B	8	9	G	73	G	E	F	G	G	8.5	9
	EUREKA	2827	4	12	A	N	A	11	8.5	N	F, PC	N	C	10	12.5	G	57.5	P	F	F	G	F	4.5	6
	GENIE	3000	3	12	A	N	A	16	13	N	PP	N	D	10	11.5	G	45	P	P	F	F	P	5	6
		200PH	2	10	A	N	A	10	7	N	F, PC	N	C	12	14.5	G	52	P	F	G	G	F	4.5	6
	HOOVER	S6755	N/A	11.6	A	Y	A	16	13	Y	PP	N	D	11.5	13	F	47	F	E	F	F	G	8	8.5
		S6631	N/A	9.2	A	Y	A	12.5	8	Y	PP	N	D	11	12.5	F	51	F	E	E	G	G	7.5	8
	JET	JV10	1.75	9	C	N	C	10	6	N	CL, PP	N*	B	8	8.5	G	76	G	E	F	G	F	8.5	8
	MAKITA	XSV-10	1.7	6.5	A	N	C	10	7	N	PP	N*	D	9.5	10	F	66	E	F	F	F	G	9	8
	MILWAUKEE	8955	1.5	6.2	A	N	B	10	9	N	PP	N*	D	10	10.5	F	46.5	G	F	F	F	G	7.5	7
	ROYAL DIRT DEVIL	081600	5	12	A	Y	A	16	13	N	PP	N	D	8	8.5	F	46.5	P	P	E	P	G	8	9
	SEARS CRAFTSMAN	17700	5	11.2	A	Y	A	16	13	N	PP	Y	D	8	8.5	F	45	F	G	F	P	F	8	9
		17702	4	10	A	Y	A	12	9	N	PP	Y	D	9	9.5	F	47	F	G	F	F	F	6	8
	SHOP-VAC	QSP 9000	2	7	B	N	A	16	14.5	N	F, PC, DB	Y	C	10	11.5	G	45.5	E	E	F	G	G	9.5	10
		610-50	1.7	7.8	A	N	C	10	7	N	PP	Y	D	10.5	11	F	53.5	F	G	F	F	G	7.5	7
LESS THAN 10 GALLONS	PORTER-CABLE	7810	2	9	B	N	A	9	5	Y	DB, PP	Y	A, E	9.5	12	G	57	E	E	E	E	G	9	9
	ROYAL DIRT DEVIL	08900	3.5	10	A	N	A	8	5	N	PP	N	D	8.5	9	F	50	P	F	E	G	G	8	9
	SEARS CRAFTSMAN	17701	3	7.6	A	N	A	8	5	N	PP	N	D	8	8.5	F	48	F	E	F	G	F	5	7
FINE-PARTICULATE VACUUMS	FEIN	42989	1.6	9.5	B	N	A	10	6	Y	DB, PP	Y	A	8	8.8	E	78	E	E	E	G	E	10	9
	WAP	SQ14	1.6	8	B	N	A	14	10	Y	DB, PP	Y	A	6	6.5	E	82	E	E	E	G	E	10	9.5
		ST20	1	8	B	N	A	6	3.5	Y	CC, DB, PP	Y	A	8*	9.5*	E	43.5	E	E	P	E	E	9	10

NOTES:

1. (A) No filter change necessary.
   (B) Remove disposable bag.
   (C) Remove cloth drum liner.
2. (A) Plastic
   (B) Painted steel
   (C) Stainless steel
   (D) Fiberboard
3. (CC) Cloth cover
   (CF) Cloth filter
   (CL) Cloth liner
   (DB) Disposable bag
   (F) Foam filter
   (PC) Paper cover
   (PP) Pleated paper
4. (•) Disposable bags are not offered for these models, but Shop-Vac disposables do fit them.
5. (A) Disposable bag
   (B) Shake cloth liner clean (does not have to be removed until drum is filled).
   (C) Disposable paper filter cover (can be shaken clean once or twice before throwing away.)
   (D) Remove filter, shake clean, and reinstall.
   (E) Shake external lever to clean filter.
6. Average number of seconds required to suck up five gallons of sawdust. Disposable bags not used.
   (•) 3.5 gallons collected.
7. Static pressure expressed in inches of water drawn up a 2"-diameter tube.
8. E Excellent
   G Good
   F Fair
   P Poor

	FEATURES				ACCESSORIES							
CORD LENGTH (FEET)	BLOWING CAPABILITY (10)	HOSE SIZE (11)	WHEEL TYPE (12)	STANDARD (13)	ON-VACUUM STORAGE (YES, NO)	WARRANTY (YEARS)	COUNTRY OF ASSEMBLY (14)	WEIGHT (POUNDS)	LIST PRICE	SELLING PRICE (15)	COMMENTS
8	EP	2½x6	C	GN	N	2	U	24	$198	$160	Large-capacity; fiberboard tank holds lots of wood shavings. Not intended for water pickup.
20	EP	2½x10	C	GN, XH, XW	N	2	U	29.5	225	130	Similar to the Delta 49-255, but with faster sawdust pickup. Three-wheel base was not as stable or maneuverable as Delta's four-wheel base.
18	EP	1½x12	PC	GN	N	1	U	40	438	299	Serious suction power. A tank that quickly separates from its cart and fabric tank liner make for easy cleaning and emptying.
6	EP	1¼x6 2½x6	C	B, CT, FN, GN, XW(2)	Y	1	U	16	180	100	Effective filters, good suction, and comes with 1¼" and 2½" hoses. Makes painfully loud noise.
10	EP	1½x7	C	CN, CT, DB, FN, GN, WN, XW	N	3	U	24	150	100	Low price, but hard to empty because of shape of tank. No tool storage. Lid locks prone to breaking but easy to replace. Ear-piercingly loud.
10	EP	1¼x7	C	FN, WN, XW(2)	N	2	U	16	107	70	Really low price, but don't use without ear protection or vacuum muffler.
12	RM	1¼x6 2½x6	C	B, CT, GN, WN, XW(2)	Y	2	U	30	160	130	Thoughtfully designed unit with system for separation of liquids and dry materials that worked perfectly.
12	EP	1¼x6	C	CT, DB, GN, WN, XW(2)	Y	2	U	23	110	90	Like Hoover S6755 but has less capacity and motor does not detach for handheld blowing.
18	NONE	1½x12	PC	FN, HC, SS, WN, XW	Y	1	T	50	395	329	Has user-friendly, quickly detachable tank and cloth tank liner. Up-top basket makes for convenient tool storage.
25	NONE	1½x12	PC	DB, GN, XW	Y	1	U	45	472	350	Like Jet it has durable stainless-steel tank. One of the quieter vacuums. Harder than most to empty because tank bolts to cart.
18	EP	1½x7	PC	NONE	N	LIFE-TIME	U	32	328	195	A good vacuum with no glaring strengths or weaknesses. Tank bolts to cart (see Makita comments). No accessories included.
20	RM	2½x7	C	GN, WN, XW(2)	Y	2	U	25	109	100	Lots of power for the money. As a handheld blower it works as well as dedicated blowers. Wide-at-bottom tank is stable but hard to clean completely. Noisey.
15	EP	2½x7	C	CN, GN, WN, XW(2)	Y	1	U	28	100	100	Excellent sawdust-sucking power at a reasonable price. Solid in most regards but lid locks tend to let go if you lift a full vacuum by its handles.
15	EP	2½x7	C	CN, GN, WN, XW(2)	Y	1	U	22	90	90	Similar to Sears Craftsman 17700, just smaller and $10 less.
25	NONE	1¼x8	C	CT, GN, WN, XW(2)	Y	2	U	22	181	125	One of our favorites because of its tank design, quiet operation, and available disposable bags.
10	EP	1½x12	PC	WN, XW(2)	N	1	U	45	280	175	We prefer the Shop-Vac QSP 9000 over this model, but this one costs more because of its stainless-steel tank and bolted-on cart.
25	NONE	1⅜x13	CW	GN	Y	1	I	16.5	448	280	The most portable and stable vacuum in test, this model is filled with unique features. It will start up automatically when you start a dust-producing tool.
15	RM	2½x7	C	GN, WN, XW(2)	Y	2	U	22	90	80	A high-ranking model among smaller machines because it's a lot like its bigger brother but with a tank that's easier to clean. Too bad it's so loud.
15	NONE	2½x7	C	CN, GN, WN, XW(2)	Y	1	U	18.5	70	70	Plenty of power for a small vacuum. Unfortunately, exhaust air shoots downward out of handles, sending dust on floor every which way and into air.
22	NONE	1½x16	C	CN, CT, DB, FN, GN, WN, XW	Y	1	G	31	695	650	A great vacuum in every respect, but expensive. Has automatic on/off feature similar to that on Porter-Cable model. Industrial quality throughout.
22	NONE	1½x10	CW	AN, AT, CT, DB, FN, GN, XW	Y	6 MONTHS	G	32	800	550	The most power and the least noise of tested vacuums. Automatic on/off feature available on higher-priced version. A high-quality machine with a price tag to match.
20	NONE	1½x7	C	CT, GN, WN, XW(2)	Y	6 MONTHS	G	16	340	190	Has lowest price among machines with excellent-rated filtering system. Too small for collecting from chip-producing machines, but great for sanders.

9. Based on a 1-10 scale with 10 being the highest possible score.
10. (EP) Exhaust port for attaching hose.
(RM) Removable motor.
11. Diameter in inches by length in feet.
12. (C) Casters
(CW) Casters and wheels
(H/W) Handheld-two small wheels
(PC) Push cart
13. (AN) Auto nozzle
(AT) Accessory tote
(B) Both 2½" and 1¼" accessories
(CN) Carpet nozzle
(CT) Crevice tool
(DB) Dust brush
(FN) Floor nozzle
(GN) General-purpose nozzle
(HC) Hose cage
(SS) Stainless-steel accessories
(WN) Wet-pickup nozzle
(XF) Extra filter
(XH) Extra hose
(XW) Extension wand
14. (G) Germany
(I) Italy
(T) Taiwan
(U) United States
15. Based on catalogs, advertisements, and manufacturer and dealer inquiries at time of article's writing. Prices may change and these figures are only an estimate of what you might expect to pay.

MANUFACTURERS' LISTING

Bosch
312/286-7330

Delta
800/438-2486
412/963-2400

Eureka
800/282-2886

Fein
800/441-9878
412/331-2325

Genie
216/829-3600

Hoover
800/293-4605

Jet
800/274-6848
206/351-6000

Makita
714/522-8088

Milwaukee
414/781-3600

Porter-Cable
901/668-8600
Canada: 519/836-2840

Royal Dirt Devil
800/321-1134
216/449-6150

Sears Craftsman
(Call or visit your local Sears store)

Shop-Vac
717/326-0502

Wap
800/237-2368
(available from Tool Crib of the North: 800/358-3096)

SHOP VACUUMS

With the Hoover two-tank system, you can channel debris into either the main tank or a removable, dry-only tank insert.

• **Liquid pickup.** Note in the chart under "wet/dry pickup" that more than half of the tested machines do not require a filter change for wet pickup. This will save you a small hassle, as will a tank drain plug found on just a handful of the vacs.

If you see yourself frequently splitting your vacuum use between picking up dry debris and liquid spills, you should know about the Hoover two-tank system shown *above*. These vacuums have separate intake ports for wet and dry debris. The "dry" intake sends debris to a removable tank that fits within the main tank, and the "wet" intake sends liquids to the main tank. The system worked perfectly in our tests, but we rarely used it in a woodworking environment. Instead, we set the "dry" tank aside so we could take advantage of the full capacity of the main tank for sawdust and other dry debris.

Our recommendations

Unlike most tool tests, in which no more than a few products typically stand out as obvious "buy" recommendations, picking clear winners among today's shop vacuums proved tricky at best. What vacuum suits you really depends on your own needs. Here, we've broken it down by price:

• **Under $150:** After working with all of the vacuums, we especially appreciate the quieter models. So, we favor the Shop-Vac QSP 9000. This machine comes in similar versions with less capacity.

But, some of us only want the most sawdust-sucking power for the dollar, and in this regard the various Sears models were tops. If you prefer a vacuum with a few more features, such as a handheld blower, check out the Hoover and Royal Dirt Devil models. And if you put "maximum capacity" at the top of your list, we recommend the 28-gallon Ryobi IDV28.

• **$150-$350:** Among pushcart-type vacuums with metal tanks, the Bosch 1702 earns our nod. In this range you'll also find the P-C 7810 and Wap ST20—two great vacs for fine-dust pickup. The P-C holds more, is more stable, and turns on automatically via power tools. The Wap costs less, is quieter, and filters finer particles.

• **Over $350:** The Wap SQ14 does it all, and if you can afford one, you'll love using it. You also can buy this machine with automatic tool switching for $50 more.

Unique features galore: Porter-Cable's 7810

This new machine is so unlike anything else in the test that we feel it deserves its own mention. Here's a short listing of special features and our observations:

•We know of no other machine priced under $300 that automatically turns on and off with your power tools. The time-saving feature works like this: You plug power tools into an outlet in the vacuum that senses when you turn the tool on. The vacuum then turns on and continues running until 15 seconds after you turn the power tool off.

•Foot-operated locks on the rear wheels help the vacuum stay put when you don't want it rolling around.

•Rather than having a rising ball that blocks the fan inlet as the tank fills with water, the P-C unit has two electrodes that sense rising water and turn the vacuum off. This adds safety, reliability, and better performance to the task of picking up liquids.

•The 7810 was the only vacuum in the test with an external lever for shaking debris from the filter. It makes for fast, clean filter cleanings.

All in all, we were quite impressed with this machine, but find it most appropriate for fine-dust extraction from portable sanders. Its small tank and tendency for the filter to clog with larger debris limit its versatility as a general cleanup tool.

Written by Bill Krier Technical consultant: Bob McFarlin Photographs: John Hetherington

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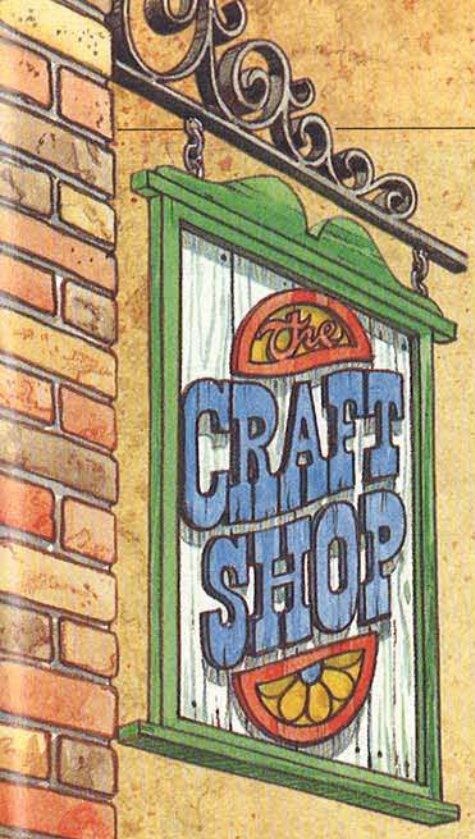
AMERICAN BEAUTY

An easy-to-build mirror in a style that reflects the past



For a touch of Americana, you can't beat this Federal hall mirror. The style is as American as apple pie—it first became popular just after the Revolutionary War. Building it even brings to mind an old American expression: Easy as pie.

Note: *You'll need standard 1/8"-thick mirror glass that measures 12 1/2×25 1/4". Your local glass dealer can cut a piece to size for you.*

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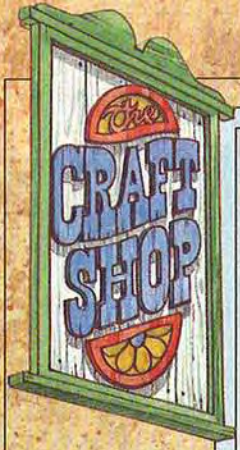
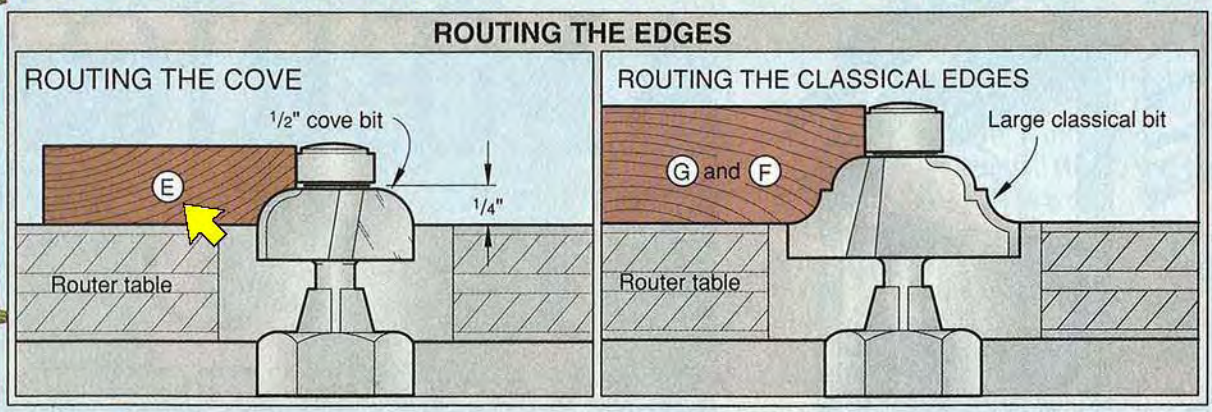
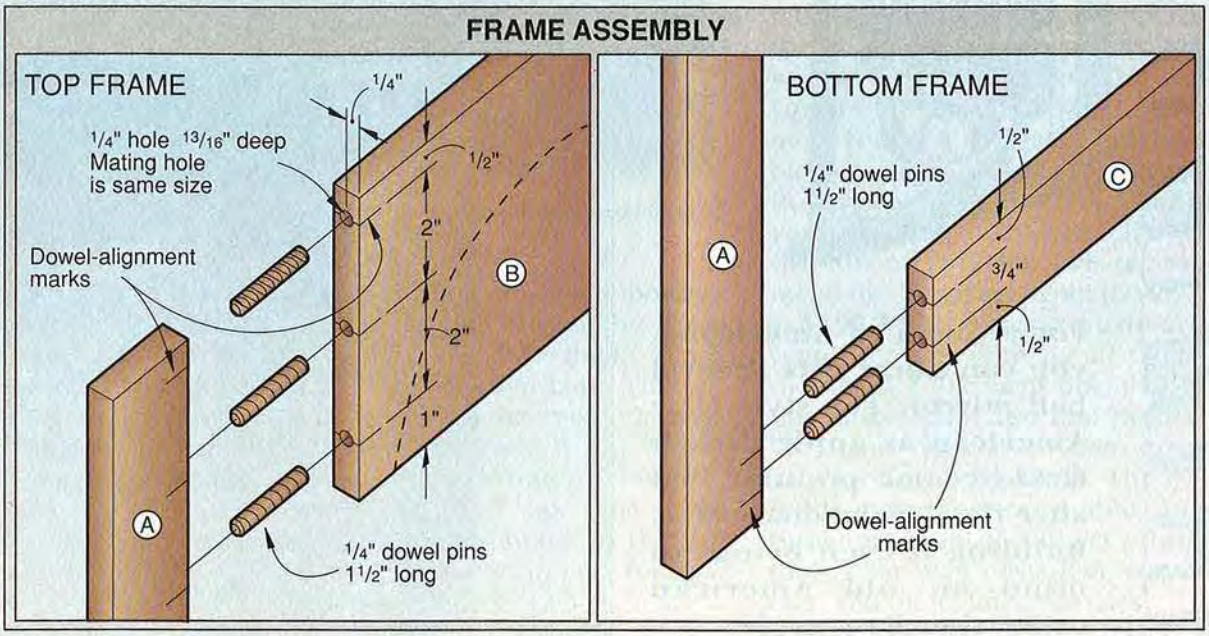






Rip and crosscut the stiles (A), top rail (B), and bottom rail (C) to the sizes shown in the Bill of Materials. Dry-clamp the parts together, keeping the joints flush. Lay out the three dowel holes at the top and two at the bottom on each side, following the Frame Assembly drawing.

Using a dowelling jig, drill the ¼" dowel holes 13/16" deep. Gauge the depth carefully in the top rail. If you drill too deeply there, you might cut into the holes when you later saw out the arch. Glue and clamp the doweled joints. Check for square by measuring the diagonals. Equal measurements indicate a square frame.

After the glue dries, sand both sides. Now, clamp the frame face-down on your bench to lay out the top-rail arch. Set a compass or a pair of trammel points to a 5⅜" radius. The center will be off your workpiece, midway between the stiles and 1 3/16" below the inside edge of the top rail. Draw the arc, then jigsaw it. Sand the arched opening with a drum sander.

Chuck a 3/16" cove bit into your router. On the face side of the frame, rout around the inside of the arch. Then, rout the stopped coves along the inside edge of each stile and the bottom rail where shown on the Exploded View drawing.

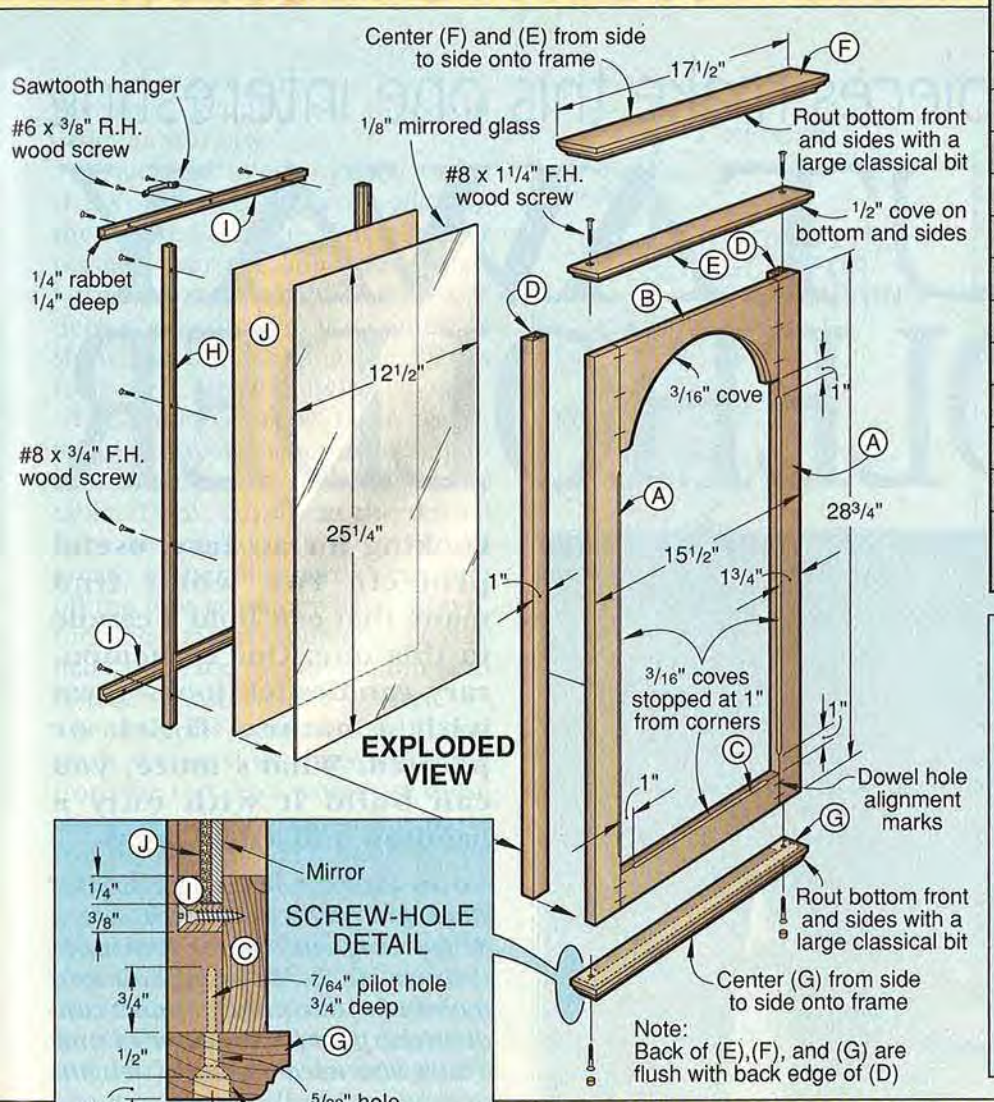
Starting with stock planed to ⅝" thick, rip and crosscut the two filler pieces (D) to the dimensions shown. Glue one to the back of each stile, flush at the outside edge and both ends.

Now, make the moldings

Cut parts E, F, and G to size. On part E, rout a cove along the front edge and both ends. (We used a table-mounted router as shown in the Routing the Edges drawing, *above*.) With the routed side down, center the trim piece from side to side on top of the frame. Align its back edge with the back of the filler pieces, and clamp in position.

Drill two 7/64" screw holes where shown. Drill ⅞" deep into part D. Remove the clamps, and enlarge the holes through part E to 5/32". Countersink them. Apply glue along the top edge of part B (but not on the end grain of the stiles), and screw the trim piece in place.

Now, rout the molding profile on the front edge and both ends



Bill of Materials					
Part	Finished Size T	W	L	Matl.	Qty.
MIRROR					
A stile	½"	1¾"	28¾"	W	2
B top rail	½"	5½"	12"	W	1
C bottom rail	½"	1¾"	12"	W	1
D filler	⅝"	1"	28¾"	W	2
E trim	⅜"	1⅝"	16½"	W	1
F top cap	¾"	2⅛"	17½"	W	1
G bottom cap	¾"	1⅜"	16"	W	1
H stop	½"	⅝"	24¾"	W	2
I stop	½"	⅝"	13⅜"	W	2
J back	⅛"	12½"	25¼"	HB	1

Materials Key: HB–tempered hardboard, W–walnut

Bit Guide

Here are some router bits that cut classical edges. Listings with two numbers indicate ¼" (listed first) and ½" shanks.

Amana 54106/54108
Bosch 85581M/85582M
Cascade C1289/C1291
CMT 841-285/841-785
Craftsman (Sears) 25533
Eagle America 171-2402/171-2405
Freud 99-009
Grizzly G1597/G1598
MLCS 1307
Vermont American 22755

of the top and bottom caps, (F and G). Do this with a classical-pattern bit (see the Bit Guide) chucked in your table-mounted router, as shown in the Routing the Edges drawing. (If you don't have the classical bit, follow the two-step edge-shaping process shown for the Classical Bookends in the January 1995 issue of *WOOD*® magazine.)

Glue and clamp the top cap (F) in position. Align the back edge with the back edge of the trim piece (E), and center it from side to side on the frame.

Next, attach the bottom cap. Center the cap from side to side, the back flush with the back of the fillers. Clamp the cap into position, and drill the 7/64" pilot holes through it into the ends of the filler pieces (D). Refer to the Screw Hole detail to enlarge the holes through the cap. Apply glue along the bottom edge of the bottom rail (C), and screw the cap to the frame. Plug the holes.

Here's lookin' at ya

Cut the mirror stops (H and I) and the back (J) to size. Install a ¼" dado blade on your tablesaw, and adjust it to cut ¼" deep. Set the saw's fence so you can cut a ¼×¼" rabbet along one edge of each stop. Drill and countersink the 5/32" screw holes where shown.

Place the frame face down on your bench. Lay the mirror and back into the frame, centering them over the opening. Position the stops around the mirror, then drill 7/64" pilot holes ¼" deep. Attach the stops with #8×¾" flathead wood screws.

Remove the mirror. Finish-sand the frame, and finish as desired. (We applied a coat of gelled walnut stain to even out the wood color. Then, we applied three coats of polyurethane, sanding between coats with 0000 steel wool.) Attach a sawtooth hanger to the back of the top stop (I) where shown. Finally, reinstall the mirror, back, and stops.

Project Design:Schlabaugh and Sons; Jim Boelling
Photograph: John Hetherington
Illustrations: Kim Downing; Roxanne LeMoine

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Missing pieces make this one interesting

CUTAWAY CANDLEHOLDER

Looking for an easy, useful project? You won't find many that can hold a candle to this one. Our contemporary candlestick looks great with a natural finish or painted. What's more, you can build it with only a bandsaw and a drill press.

Note: *You'll need 2¾×2¾×3½" stock for each candlestick. Use a 3" turning square, or laminate thinner stock. We used oak and walnut for our natural-finish candlesticks; pine for the painted one. You'll also need eight 2½" lengths of ⅛" dowel rod.*

Saw your stock to size, and cut eight 2½" lengths of ⅛" dowel rod. Photocopy the full-sized Top View pattern *opposite page*. Adhere the pattern to the end of the stock that will be the top of your candlestick.

Chuck a 1⅛" Forstner bit in your drill press. Grip the workpiece with a handscrew clamp, and bore into the center 2¼" deep. With a ⅞" bit, bore ½" deeper on the same center. Next, drill eight holes for ⅛" dowels around the large hole where shown.

On the side of the block, mark the six ⅜"-wide sections shown on the Front View pattern. Also draw a dark pencil line from top to bottom along one corner to aid in alignment later. Bandsaw along

the lines, keeping the pieces in order as you saw.

Restack the pieces in the order that you sawed them off, aligning the marked corners. Put a fender washer over the large hole, then fasten the stack together with a 3" deck screw through the center, as shown in the Stacking the Pieces for Bevel-Cutting drawing.

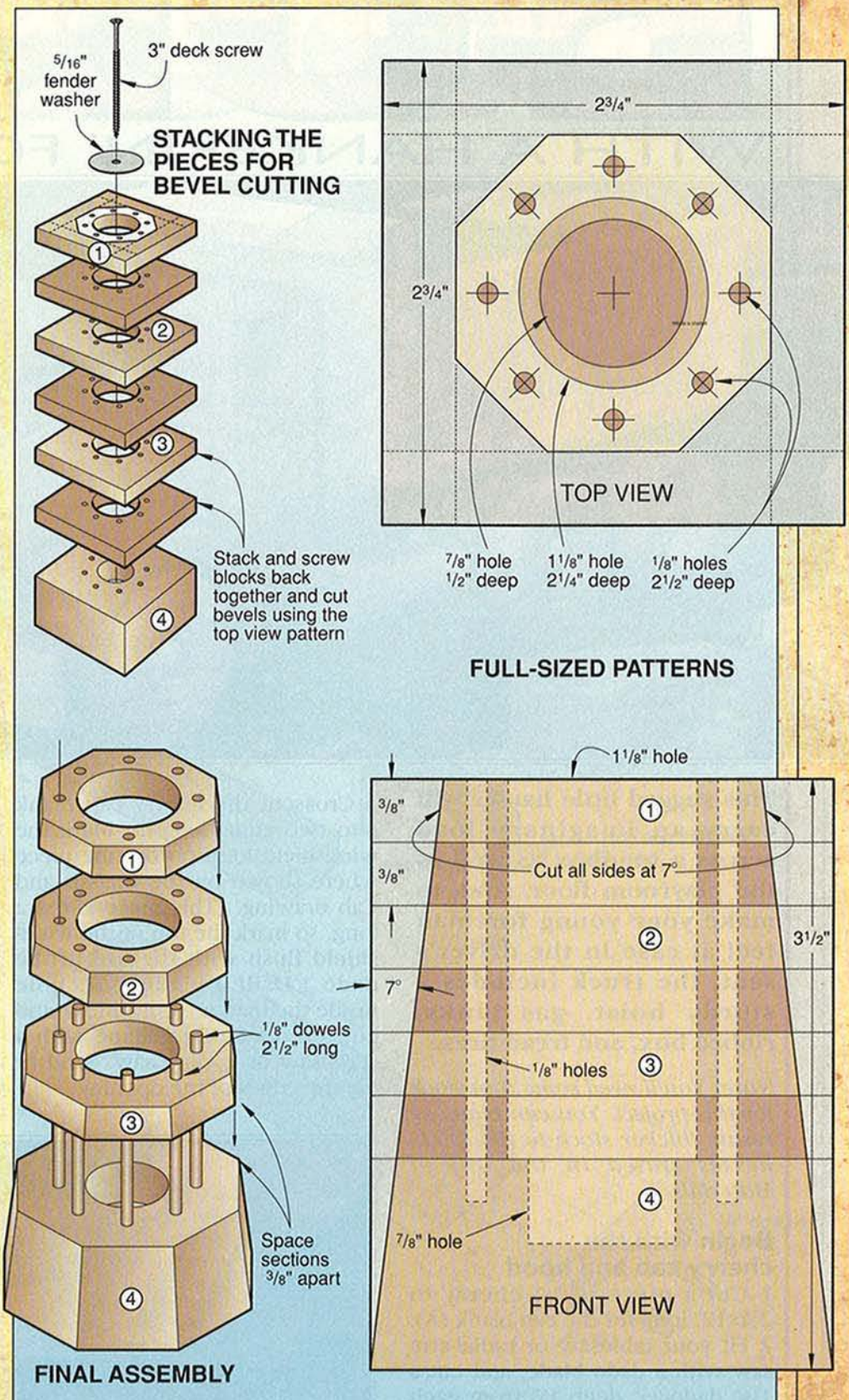
Tilt your bandsaw table to 7°. Stand the workpiece on its unpatterned end on the high side of the table. Then, cut along the dotted lines on the Top View pattern to create a tapered square. Next, saw off the four corners where shown, forming a tapered octagon. Lightly mark one face for orientation, and remove the screw and washer.

Remove the second, fourth, and sixth sections, or rings, counting from the top. You won't use these three. Sand the remaining parts for finishing. Mark each piece inconspicuously for alignment.

Glue a length of dowel into each small hole on the base (the largest piece). Cyanoacrylate (CA) adhesive does the job quickly and neatly. Next, slide the large ring onto the dowels. Push it down until it's about 3/8" above the base and parallel to it. Glue it to a couple of the dowels with a drop of CA adhesive applied from the bottom. (We applied the adhesive right where the dowel passes through the ring, let it wick into the joint, then sprayed a mist of CA accelerator over the joint.)

Install the other two rings. As you fit the top one in place, keep the ends of the dowels flush with or a little above the ring's top surface. If some of the dowels stick up a bit, you can sand them down after the glue dries.

Finish the candlestick as desired. For a painted one, apply a coat of primer, then finish with artist's acrylic color or latex enamel. For a natural-finish version, apply clear oil finish (our choice for the ones shown) or polyurethane.



Project Design: Dawn Eyestone Illustrations: Kim Downing Photograph: John Hetherington

CONSTRUCTION-GRADE DUMP

WITH A HANKERIN' FOR HAULIN'

This rugged little hauler will carry an imaginary load across a sandbox as well as the playroom floor. And, to make your young foreman feel at ease in the driver's seat, the truck includes a sturdy hoist, gas tanks, ribbed box, and tread tires.

Note: *You'll need some thin stock for this project. You can plane or resaw thicker stock to the thicknesses stated in the Bill of Materials.*

Begin with the cherry cab and hood

1 Cut a piece of ¾" cherry to 2¾×12" long for the cab blank (A).

2 Fit your tablesaw or radial-arm saw with a dado blade, and cut a 1⅛" dado ½" deep ½" from each end of the cab blank where shown in the photo *at right*.

3 Crosscut the cherry cab blank into two equal lengths. Mark the windshield location on one piece where shown on the Chassis and Cab drawing. (This piece is extra long, so mark the top of the windshield flush with the top of the dado.) Drill a blade start hole inside the marked windshield, and cut the opening to shape with a scrollsaw or coping saw. Sand or file the edges of the opening.

4 Apply glue to the mating surfaces, align the dadoes, and clamp the cab parts together face-to-face. Before the glue completely dries, use a sharp chisel to remove the excess from inside the cab opening. To finish forming the cab (A), trim the top and bottom of the cab lamination to length (3¼"), leaving ¼" of stock above the opening where dimensioned on the Chassis and Cab drawing.

Continued

Cut a dado ½" from each end of the cab blank. A long piece of stock (12" or more) is safer to machine than two shorter ones.

Print this article

TRUCK

Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
CAB/CHASSIS ASSEMBLY					
A* cab	1½"	2¾"	3¼"	LC	1
B* hood	2¼"	2"	3¼"	LC	1
C chassis	¾"	2¼"	11"	C	1
D hoist support	¾"	1¾"	7¼"	C	1
E running board	¼"	1½"	3¾"	C	1
F fenders	¾"	1⅞"	2⅞"	C	2
G bumper	¾"	⅜"	3¾"	M	1
BOX					
H bottom	¼"	4½"	6¾"	M	1
I front	¼"	4½"	3"	M	1
J sides	¼"	2"	6¾"	M	2
K lip	¼"	1¼"	4½"	M	1
L support	⅜"	⅜"	4½"	M	1
M hoist	31/32"	1"	2¼"	M	1
N alignment bar	½"	½"	2¾"	M	1
O trim	¼"	½"	6¾"	M	2
P trim	¼"	¼"	2"	M	8

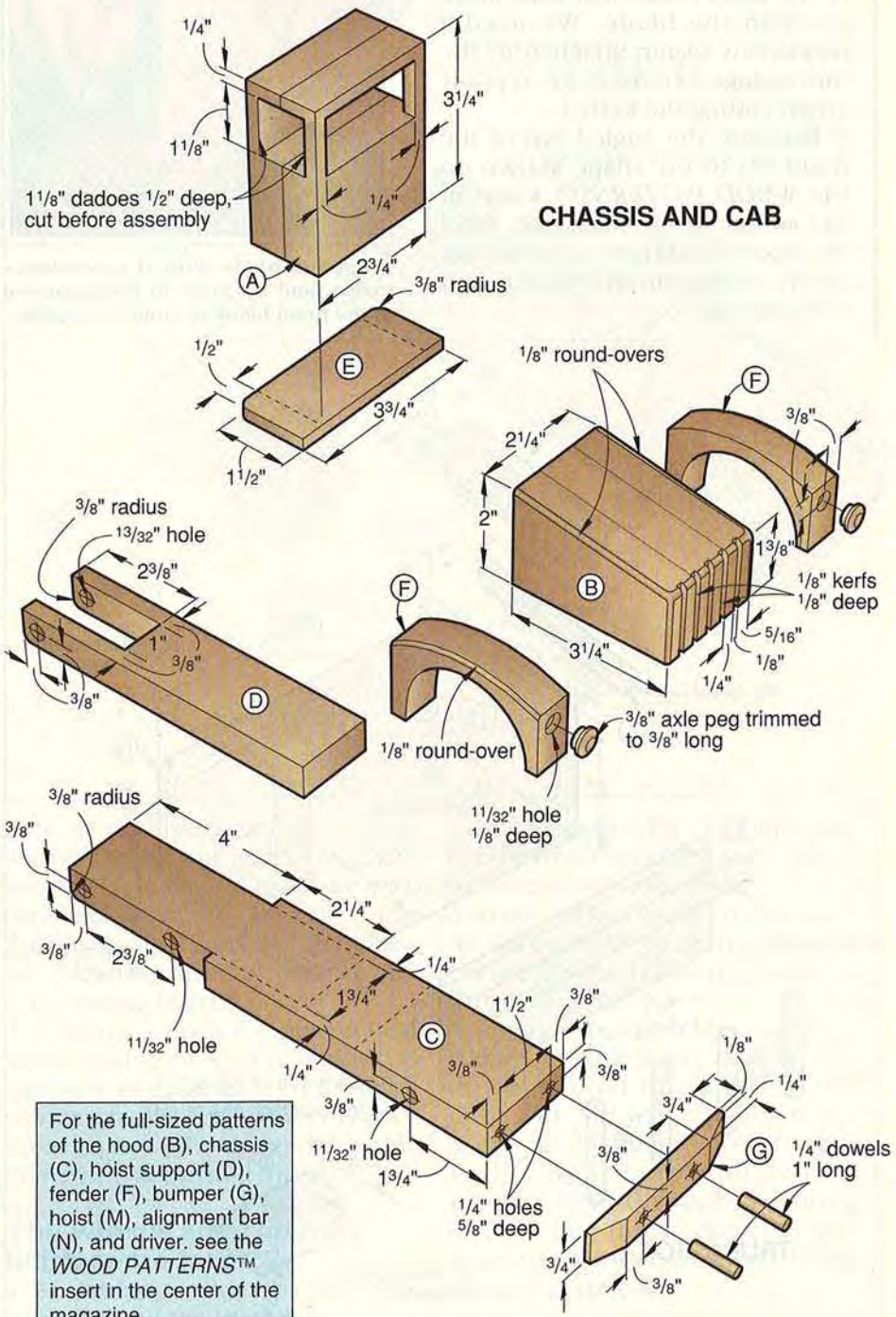
*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Materials Key: LC–laminated cherry, C–cherry, M–maple.

Supplies: ¼", ⅜", and 1" dowel stock; 2–#6×¾" flathead wood screws, #18×½" brad, clear finish.

Buying Guide

Toy parts. Ten 2" grooved, single wheels with ⅜" holes; 8–⅜" and 2–¼" axle pegs; and one toy person. Part no. 1245, $5.95 per kit, plus $3.50 shipping per order. Meisel Hardware Specialties, P.O. Box 70W, Mound, MN 55364 or call 800-441-9870 to order.



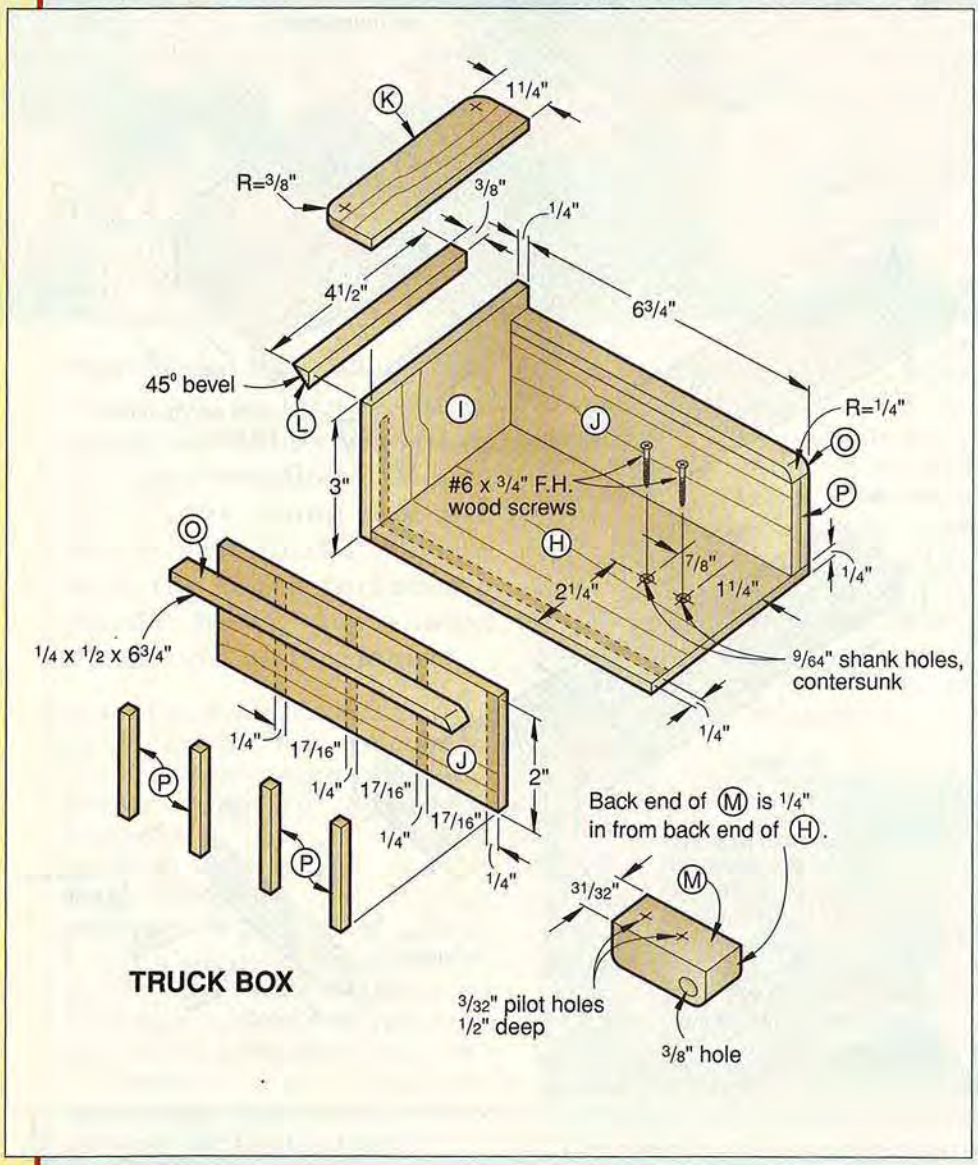
For the full-sized patterns of the hood (B), chassis (C), hoist support (D), fender (F), bumper (G), hoist (M), alignment bar (N), and driver. see the *WOOD PATTERNS*™ insert in the center of the magazine.

DUMP TRUCK

5 Laminate ¾" stock to form a hood blank measuring 2¼×2×3¼". Cut ⅛" kerfs ⅛" deep in the front end of the lamination. (As shown in the photo *at right*, we marked reference lines on the top surface of the hood blank, and used these to align the blade. We used a handscrew clamp attached to the miter-gauge extension for support when cutting the kerfs.)

6 Bandsaw the angled top of the hood (B) to the shape shown on the *WOOD PATTERNS*™ insert in the center of the magazine. Sand the hood, sanding ⅛" round-overs where shown on the Chassis and Cab drawing.

Align the blade with the reference marks, and cut kerfs in the front end of the hood blank to simulate a grille.



Next, add the chassis assembly and fenders

1 Cut the chassis (C) to 2¼×11" from ¾" stock.

2 Lay out the notches and axle hole centerpoints where shown on the Chassis and Cab drawing and on the full-sized drawings on pattern insert in the center of the magazine. Drill three 11/32" axle holes through the chassis where marked. Cut the notches to shape.

3 Sand a ⅜" radius on the back bottom edge of the chassis (C) where shown on the Chassis and Cab drawing.

4 Cut the hoist support (D) to 1¾×7¼". Mark a centerpoint and drill a 13/32" hole through the support where located on the drawing. Cut the notch in the rear of the support to shape.

5 Cut the running board (E) to the size listed in the Bill of Materials. Scrollsaw or sand a ⅜" radius on the back corners of the part E.

6 Transfer the full-sized fender patterns to ¾" stock, and cut the fenders (F) to shape. (To ensure identically shaped fenders, we used double-faced tape to adhere the two fender blanks together face-to-face. We bandsawed the pieces to shape, drum-sanded the curved surfaces to remove the saw marks, and then pried the two fender pieces apart with a wooden wedge.)

7 Holding one fender steady with a handscrew clamp, use your drill press fitted with a 11/32" brad-point bit to drill a hole for the headlight. Repeat for the opposite fender. Trim ⅜" axle pegs to length, and glue them in place for use as headlights.

8 Transfer the bumper pattern to ¾" stock, and cut the bumper (G) to shape.

Assemble the cherry pieces

1 With the front ends flush, glue and clamp the hood (B) to the chassis (C). The outside edges of the hood must be flush with the outside edges of the chassis.

2 Right behind the hood, glue and clamp the running board (E) and cab (A) in place. Directly behind that, glue and clamp the hoist support (D) in place.
3 Glue and clamp the bumper (G) to the front of the chassis. Then, drill a pair of ¼" holes through the bumper and ⅝" into the chassis front. Glue a ¼" dowel into each hole, and trim and sand the front of each dowel flush with the front surface of the bumper.
4 Glue and clamp the fenders (F) to the outside surfaces of the chassis and hood.

Build the box for plenty of payload

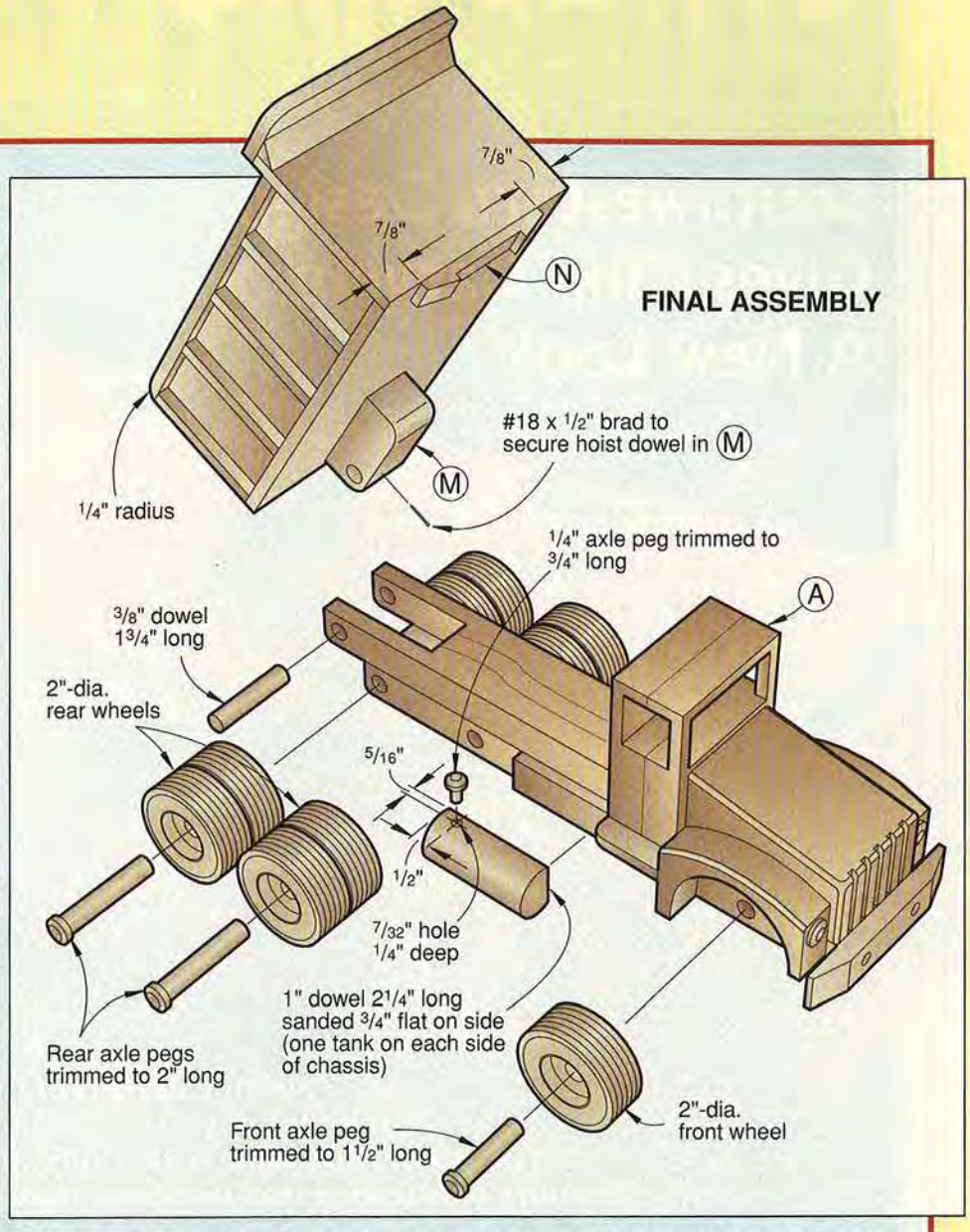
1 From ¼"-thick maple, cut the box bottom (H), front (I), sides (J), and lip (K). Now, cut the lip support (L), hoist (M), and alignment bar (N) to size. See the *WOOD PATTERNS*™ insert for the shapes of parts M and N.
2 Drill a ⅜" hole through the hoist block (M), and cut and sand a ⅜" radius on the bottom front and back edges.
3 Glue and clamp box pieces H, I, and J together, checking for square. Later, add the lip pieces (K, L) and alignment bar (N) to the box. Drill countersunk holes, and glue and screw the hoist (M) to the bottom side of the box bottom (H). The back end of the hoist sits in ¼" from the back end of the box bottom.
4 Cut ¼"-thick trim pieces (O, P) to size. (We planed thicker stock to ¼", and ripped the trim strips from it.) Glue and clamp the strips to the sides of the box where shown on the Truck Box drawing.

Now, add the fuel tanks and driver

1 From 1" dowel stock, crosscut two pieces to 2¼" long for each fuel tank. See the Final Assembly drawing *above right* for reference.
2 On a stationary sander, sand a ¾"-wide flat spot along one edge of each fuel tank. Drill a ¼"-deep hole in each tank where shown *above*. Crosscut a pair of ¼" axle pegs to ½" long, and glue one into each tank to act as a gas cap.
3 Glue the fuel tanks to the chassis sides (C) directly behind the cab/running boards.
4 Clamp a 2"-high toy person in a small handscrew clamp, and use a bandsaw to make two cuts where shown on the *WOOD PATTERNS* insert to form the driver. Glue the driver in place inside the cab.

The wheels and clear finish come last

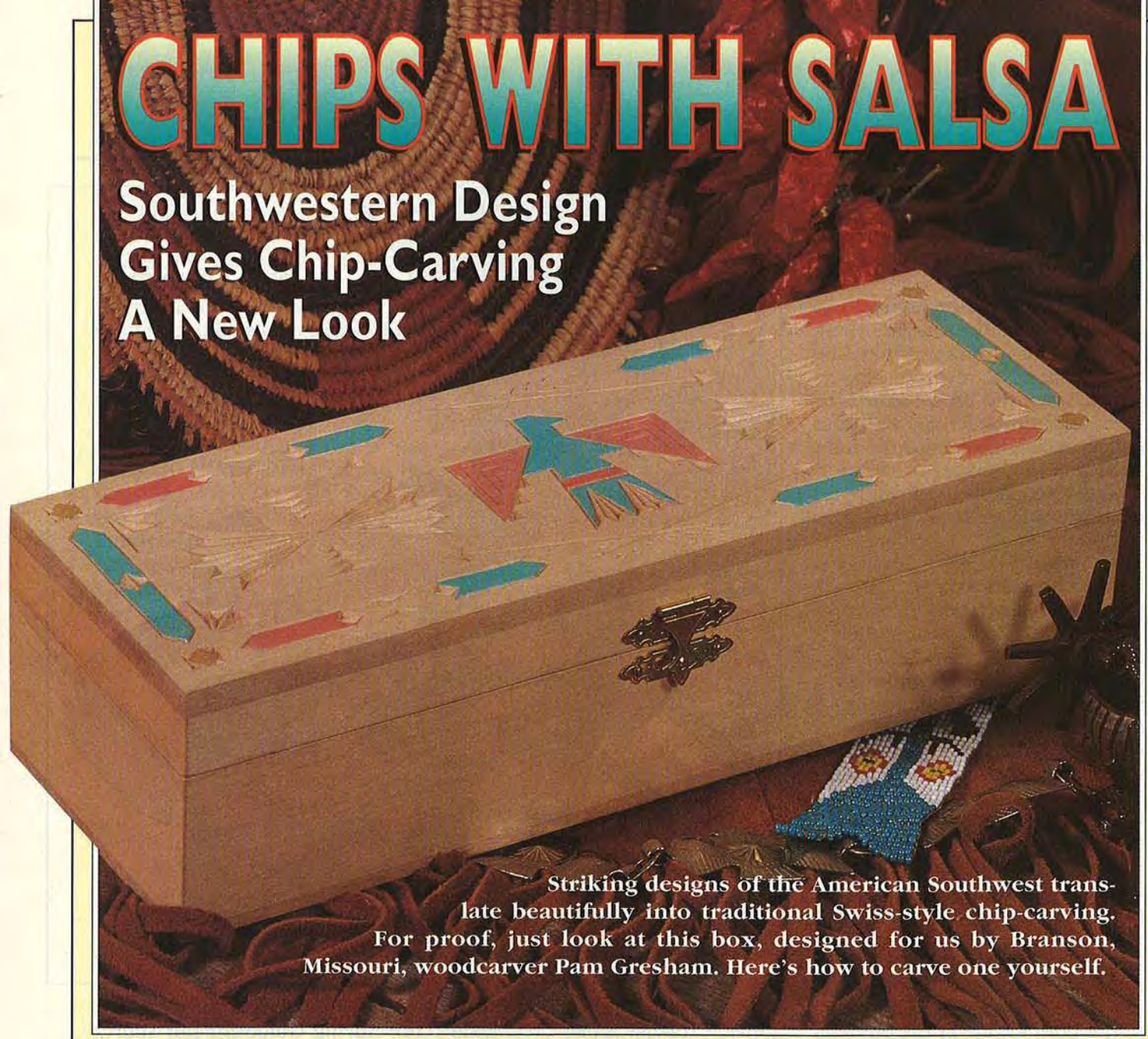
1 Finish-sand the chassis/cab assembly and the truck box.
2 Trim the ⅜" axle pegs so the wheels have just enough free play to turn freely. Secure the wheels to the chassis with the pegs. See the Buying Guide for our source for wheels and axle pegs.
3 Apply a clear finish (we sprayed on three coats of satin polyurethane; it's easier than trying to brush on a finish).
4 Using a ⅜" dowel 1¾" long, secure the box to the chassis. The dowel should fit tightly in the hoist (M) and move freely in the holes in the hoist support (D). Drill a pilot hole, and drive a #18×½" brad through the hoist (M) and into the ⅜" dowel to prevent the dowel from working loose over time.


FINAL ASSEMBLY
7/8"
7/8"
N
#18 x 1/2" brad to secure hoist dowel in M
M
1/4" radius
1/4" axle peg trimmed to 3/4" long
A
3/8" dowel 1 3/4" long
2"-dia. rear wheels
5/16"
1/2"
7/32" hole 1/4" deep
1" dowel 2 1/4" long sanded 3/4" flat on side (one tank on each side of chassis)
Rear axle pegs trimmed to 2" long
2"-dia. front wheel
Front axle peg trimmed to 1 1/2" long

Written by Marlen Kemmet
Project Design: Thomas Smith; Jim Boelling
Illustrations: Jamie Downing; Roxanne LeMoine
Photographs: King Au; John Hetherington

CHIPS WITH SALSA

Southwestern Design Gives Chip-Carving A New Look



Striking designs of the American Southwest translate beautifully into traditional Swiss-style chip-carving. For proof, just look at this box, designed for us by Branson, Missouri, woodcarver Pam Gresham. Here's how to carve one yourself.

Project prep

Stock: Carve the design on a ½×3¾×10¾" plaque of your favorite carving wood or on the lid of a 3¾×10¾" box 2¾" tall, as shown. Make your own box, or see the Buying Guide in the *WOOD PATTERNS™* insert for information about ordering a ready-to-carve box.

Tools: Chip-carving knife, stab knife, shown on *opposite page.*

Professional woodcarver Pam Gresham of Branson, Missouri, designed and carved this pattern just for *WOOD®* magazine readers. Inspired by the arts and crafts of native American tribes in the Southwest, she chose the thunderbird as the carving's centerpiece. She combined this traditional symbol of happiness with the crossed arrows of friendship.

Pam's design calls for carving two basic chips, the straight chip and the triangular one. Carve these with a chip-carving knife, such as the one shown in the *top* photo on the *opposite page*. You'll also need a stab knife (*bottom, opposite page*) to make accent impressions. If you're not familiar with the techniques, first read The ABC's of Chip-Carving *opposite page* for a brief rundown.

Dip into the chips

Photocopy the full-sized pattern in the *WOOD PATTERNS™* insert in the middle of the magazine. Tape the pattern to the top of the box lid, centering the design. Slide a piece of graphite transfer paper or carbon paper under the pattern. Then, trace the lines with a sharp pencil. A straightedge will help you trace more accurately.

When carving the straight chips that make up the border elements

and the thunderbird, cut each line separately. That is, don't try to carve around the sharp corners. Where lines meet, stop-cut the end of each line. Just make a small slice with the knife tip perpendicular to the end of the chip. This will help the straight chip break out cleanly at each end.

Carve the fans, corner ornaments, thunderbird's tail, and diamond border ornaments as a series of adjoining triangles. Work systematically. After carving the first triangle in any element, carve subsequent ones by making the first cut along the side that adjoins the previous triangle.

The triangular chips that make up each fan ornament converge toward the center. Because they're so narrow at the inside points, try this for easier carving: When you cut the sides, start from the center with the knife blade straight up and down instead of laid over at the usual 65° angle. Do not cut deeply at first. As you reach the wider part of the chip, lay the knife over and cut deeper. Finish the chip by cutting the end.

After cutting all the chips, lightly sand the carving—just enough to remove any traces of pattern lines. Don't sand so much that you soften the edges of the carved details. After sanding, add the arrow fletching with your stab knife.

Try a Southwest finish

A clear coating such as lacquer or polyurethane makes a simple, effective finish for the box. (Use a matte or semi-gloss finish rather than a high-gloss one.)

Or to heighten the southwest look, accent the carving with acrylic paints. Turquoise and dusty pink set off the border elements and thunderbird on the box shown. Antique gold highlights the corner diamonds.

For the finish on the box shown, Pam first painted the design with acrylic paints. After the paint dried, she applied water-based Carver Tripp birch stain to the entire box. Clear polyurethane protects the completed box.

Project Design: © Pam Gresham
Photographs: John Hetherington
Illustration: Jamie Downing

THE ABC's OF CHIP-CARVING

A look at the tools and techniques

In chip-carving, you simply remove precisely cut pieces of wood to leave an incised pattern. One popular style of chip-carving requires only two special tools—the knives shown *below*.

You'll use the chip-carving knife (shown in the *top* photo) for most of the carving. The stab knife (shown in the *bottom* photo) comes into play for creating accents.

There are two ways to hold the chip-carving knife. (We'll cover the stab knife later.) For the first grip, which you'll use most often, grasp the knife in your right hand (or left, if you're left-handed), with the first joint of your thumb against the side of the blade end of the handle. Wrap your fingers around the handle so its top edge runs diagonally across your palm.

Place the workpiece on your lap. Turn your knife-hand wrist so the end of the blade, the tip of your thumb, and the knuckle of your index finger rest on the wood. This places the blade at about a 65° angle to the wood, pointing toward you. Hold your carving-arm elbow close to your body.

For the second grip, roll the knife handle in your hand so the meaty part of your thumb presses on the blade's spine. This position puts the other side of the blade at a 65° angle to the wood, enabling you to cut in the opposite direction.

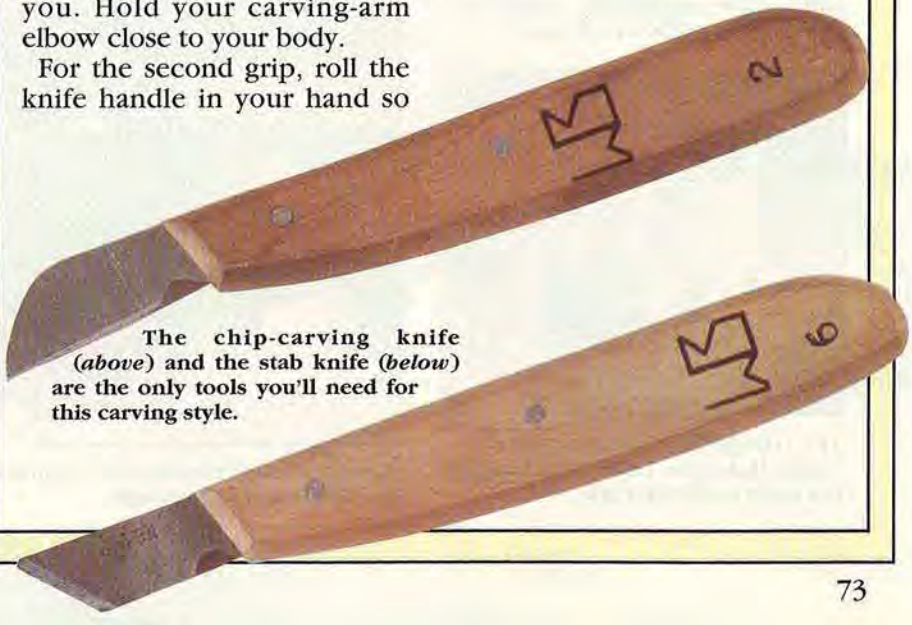
Holding the knife at a fixed angle means that the width of any chip determines its depth (they'll be approximately equal). As you carve, visualize where the tip of the knife is in the wood. Push it in deeply enough to reach the center of the chip.

Here's how to cut the chips

The straight chip is simply an incised line, much like the cut a V-tool would make. Carve this wherever a straight or curved line appears on the pattern for the box top.

To cut it, hold the knife in the first grip. Position the workpiece with the cutting line pointing toward you, slightly off to your right (left, if you're holding the knife in your left hand). Place the knife point at the far end of the line, slightly—maybe 1/32"—to the

Continued page 74



The chip-carving knife (*above*) and the stab knife (*below*) are the only tools you'll need for this carving style.

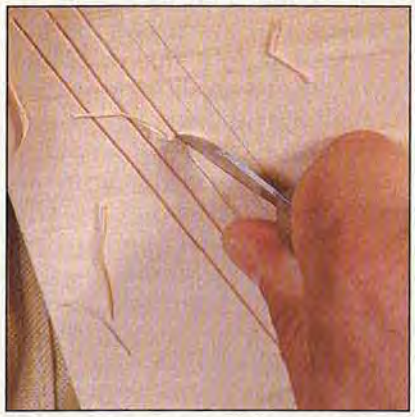
THE ABC's OF CHIP-CARVING

Continued from page 73

side so that the tip will be about 1/16" into the wood and directly below the line when you cut. Then draw the knife smoothly and steadily along the line.

Turn the workpiece around, then cut along the line in the other direction. This cut meets up with the first one below the surface. As you slice along the line, you'll release a uniform sliver of wood, leaving a V-shaped groove about 1/16" wide, as shown in the photo *below*.

Triangular chips call for three steps. To cut a triangular chip, start with the knife in the first grip, and place the point on the far end of your first cutting line. (You can start with any side of the triangle.) Cut along the side, as shown in the photo at the *bottom* of this column.

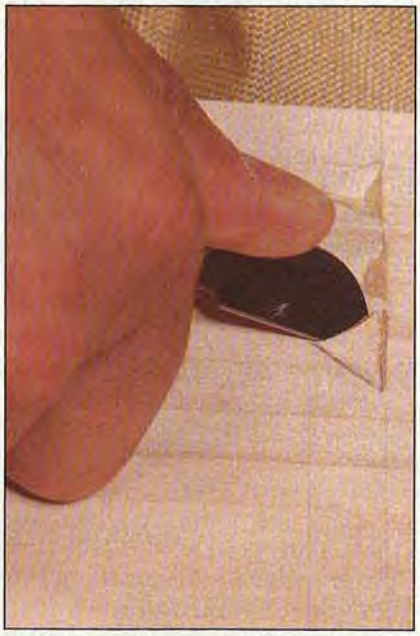


After cutting in one direction for the straight chip, turn the workpiece and cut in the opposite direction. Use the first grip for both cuts.

The triangular chip is cut in three steps. Make the initial cut holding the knife in the first grip.

Then turn the workpiece 90° and change to the second knife grip to make the next cut. Keep the workpiece close to your body and cut along the side, as shown in the top photo *below*. With the workpiece in the same position, change back to the first knife grip for the third cut. As you complete the cut, a pyramidal chip should pop out, shown *bottom*.

For a crisp carving, make each cut in one thrust. As much as possible, plan your sequence of cuts to avoid cutting toward completed work as you continue to carve.



Turn the workpiece and change to the second grip for the next cut.

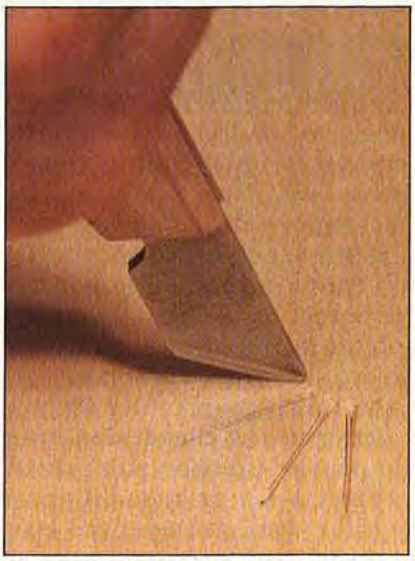
Change back to the first grip to make the final cut in the triangle.

The stab knife makes an impression that looks somewhat like an arrowhead. Hold the knife as you would an ice pick, the long side of the blade away from you. Stab the knife straight into the wood at the pattern mark, as shown *below*. Pull the knife handle toward you to create the thin point. How far you pull, of course, determines how long the point will be.

Keen knives do a sharp job

Success in chip-carving demands clean, precise cutting, which in turn calls for sharp knives. Hone them on an ultra-fine stone. Hold the side of the chip-carving knife's blade at a 10° angle to the stone, the stab knife at the factory angle—about 30°.

To do your best work, you'll need to resharpen the knives periodically. Whenever cutting effort increases or cross-grain cuts look fuzzy, it's time to hone your knife's blade.



Use the stab knife to make decorative impressions. Jab the end of the knife into the wood, then pull the handle toward you.

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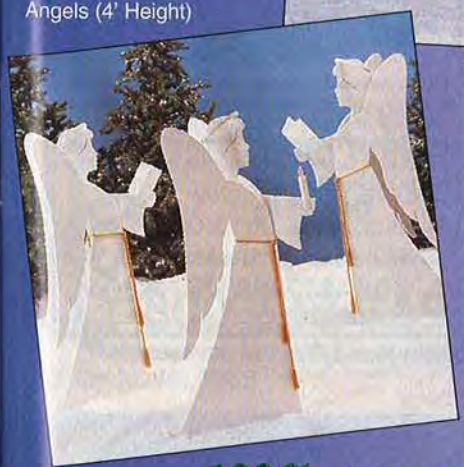

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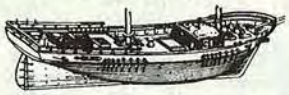

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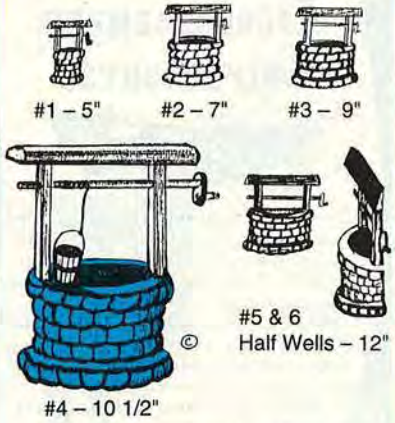

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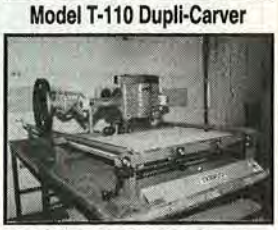

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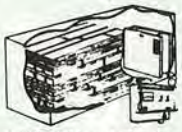

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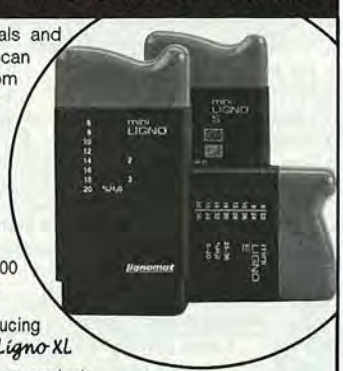

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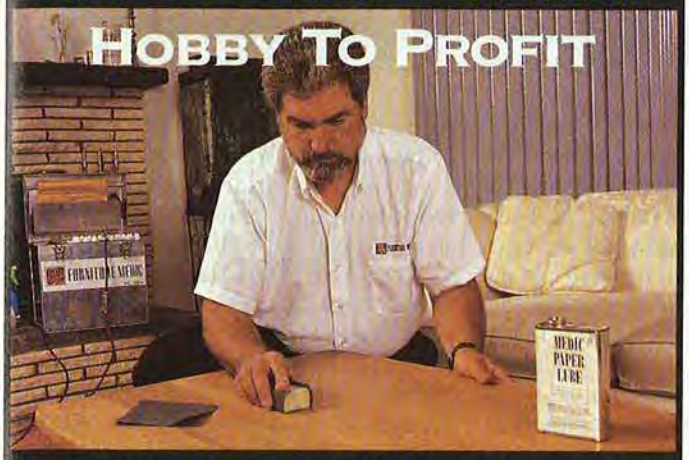

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WOOD ANECDOTE

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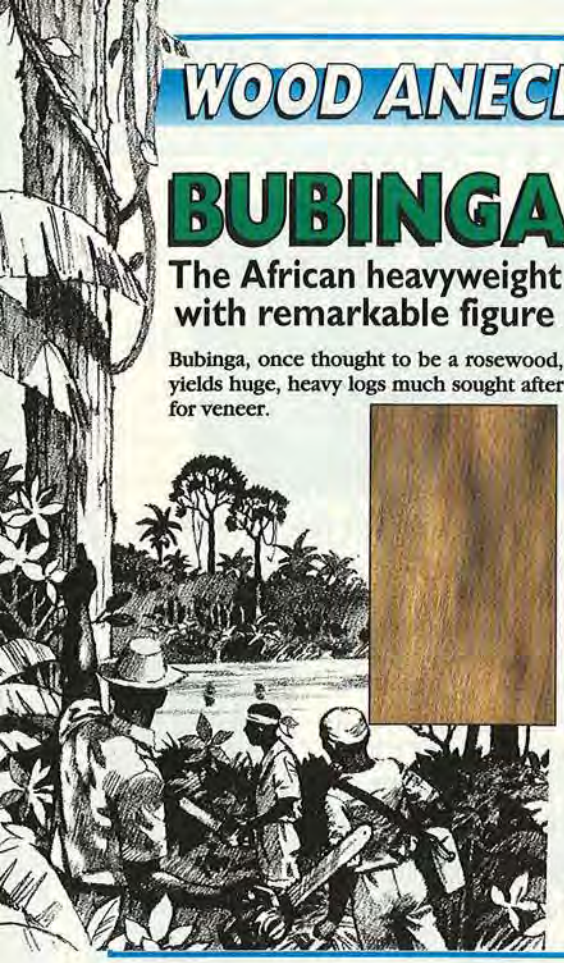

In the swamps and along the jungle waterways of Gabon in Equatorial Africa, there grows a giant of a tree. Towering at 130' or more, it yields mostly defect-free logs 6' in diameter and up to 70' long. Such a log can weigh as much as 10 tons, so loggers must await the seasonal rains to float the wood to port.

European woodworkers probably know little of the rugged origins of one of their favorite veneers. What they do know, though, is that the rotary-cut veneer that they call *kevazingo* has a wonderful swirling figure that's equally eye-catching as paneling or cabinetry. Even their predecessors recognized the classy qualities of this wood. It regularly appeared in French Renaissance furniture of the 1700s, when this rich reddish wood was named *bois de roe d'Afrique* (African rosewood) because it was thought to be a type of rosewood.

Across the Atlantic, American woodworkers scratch their heads at the word kevazingo. They recognize the strikingly colored wood from Africa's steamy jungles as bubinga (*Guibourtia demeusei*). Woodturners especially like its even texture and delicate veins of dark red and often purple. And luthiers, always seeking new stock, have fashioned bubinga into guitar sides and backs as a substitute for their favored rosewood. But they'll never see much bubinga in board form at any one time. That's because it weighs nearly 60 pounds per cubic foot, making shipping expensive. Turned into rotary-cut veneer at African mills, though, massive bubinga logs become kevazingo and reach more markets at far lesser cost.

Illustration: Jim Stevenson

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Professional TiN coated bits always outlast standard steels! Includes 3/8" cut down shanks and individually organized wooden case. Rockwell hardness range from 55-65 HRC. 20 Sizes from 1/4" to 2"

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10" BENCH TABLE SAW
- Max. depth of cut @ 90°: 3"; @ 45°: 2-1/2"
- Motor: 2-1/2 HP, 120 volt, 4800 RPM
- Blade sold separately

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10" SAW BLADE
- 40 Tooth Carbide Tips

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18 GAUGE AIR BRAD NAILER
This unit has the features you need: safety trigger, adjustable nailing depth, see-through magazine, and easy jam clearance. Slides are high impact plastic. Tool weight: 2 lbs.
- Uses 18 gauge brads 5/8" to 1-9/16"
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- 100 brad maximum capacity

18 GAUGE BRADS (5000 PACK)

LENGTH	ITEM	PRICE
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Circle No. 46

THE CUT IS EVERYTHING!

FREE - $45 IN SHARPENING COUPONS WITH EACH BLADE OR DADO SET

Buy any blade or Dado — or Buy Our Best Seller 10" x 40T for only $119 (list $156, save $37!) — and also receive $45 in sharpening discount coupons. (Total Savings $82 OR MORE!!)

SALE PRICES!!
NO-CHIP BLADES & DADO SETS for MELAMINE and OAK/BIRCH VENEER • VERTICAL & HORIZONTAL PANEL SCORING SETS • RADIAL & CHOP SAWS
INQUIRE!!

GOOD ON ALL FORREST OR OTHER MAKES OF CARBIDE BLADES OR DADO SETS. Total Savings $82 or more! Nine $5 sharpening coupons supplied with blade or dado. Offer good through April 30,1995. Must mention WOOD mag. to receive coupons and extra bonus.

WOODWORKER II	List	SALE
14" x 40T x 1"	$215	$149
14" x 30T x 1"	195	139
12" x 40T x 1"	183	129
12" x 30T x 1"	162	119
10" x 40T x 1/8" or 3/32"	156	119
30T 1/8" or 3/32"	135	99
9" x 40T	146	109
30T	125	99
*8-1/4" x 40T 3/32"	136	99
8" x 40T 3/32"	136	99
30T 3/32"	115	89
7-1/4" x 30T 3/32"	112	69
**NEW 6" x 40T 3/32"	136	89

***NEW For Sears & Makita Table Saws **For Saw Boss**

5/8" holes, boring thru 1 1/4" add $7.50
Larger at Time Basis Shipping $4.50

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CHECKS OR CREDIT CARD

Outperformed 36 other premium blades.
Wood Magazine test, Sept., '93, pg. 45.

Dear Sirs,
Never before had I seen your blade in action, but I wouldn't have believed it if I had not seen it! I was so impressed with the glass-like cut the Woodworker II blade made on various wood types that I went to "Woodworking Unlimited" the next day and bought your dado set!!
David Sharp
Sugar Land, Texas

Dear Sir,
When I first saw your ads for your saw blades, I thought that if one quarter of what you were claiming was true, the blade would be worth buying. Now having bought and used one, I have found all of your outrageous claims to be justified - it's a terrific tool.
Peter Lauritzen - Carpentry
Tesuque, NM
P.S. I hope to see these available in 7 1/4" size in the future, for skilsaws
"They are right now, Peter."
Jim Forrest

Gentlemen,
I have used many different blades during my forty plus years of working. There is absolutely no comparison to any other blades on the market and your WW I & II blades.
Kenneth L. Salisbury
Huntsville, AL

FOR BETTER CUTS on all brands of blades, use our large 1/8" DAMPENERS-STIFFENERS against one side.
- Parallel and flat to .001"
- Stop vibration, flutter, CUTTING NOISE and blade ring
- Tryable and returnable for full cash refund

4"	$21
5"	24
6"	25

FULL RANGE OF OTHER INDUSTRIAL SIZES

The One Blade That Leaves A Smooth-As-Sanded Surface!!!

(From Another Customer)
In closing I would like to add that the Woodworker II blade is by far the finest saw blade that I have ever used. I also have the Forrest dado set which is without a doubt, the king of all dado sets. I work exclusively with red oak and oak veneer plywood and the dado set performs splinter-free cuts as advertised.
It is a pleasure to purchase a product that does what it is advertised to do. Thanks for making such a fine product.
Dennis R. Schule, Owatonna, MN

UPGRADE YOUR CHOP AND SLIDING MITER SAWS WITH OUR CHOPMASTER

New specs • 5° Neg. Pts. & a flat, runout less than .002" for perfect, tight, smooth, splinter-free miter joints.
NEW AVAILABLE SIZES

		List	SALE
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Sears 8-1/4" & Delta	8-1/4" x 60T x 5/8"	170	99
Hitachi 8-1/2" DeWalt 8-1/2" & Ryobi	8-1/2" x 60T x 5/8"	179	109
Delta	9" x 80T x 5/8"	204	119
Ryobi-Makita & all	10" x 80T x 5/8"	207	129
DeWalt, Makita, B&D & Hitachi	12" x 80T x 1"	229	139
Ryobi-Makita	14" x 100T x 1"	266	179
Hitachi	15" x 100T x 1"	277	189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I

Use small stiffener where possible

QUIET! ***Also help all your other blades to cut better.***
Use our 1/8" DAMPENER STIFFENERS, against one side

4" - $21
5" - $24
6" - $25

Tryable and RETURNABLE. CUTS NOISE to 1/2 or 1/4. Stops vibration, flutter, cutting noise and blade ring. Parallel and flat to .001 • 7" and larger available.

5/8" holes std. Boring up to 1-1/4" $7.50 extra. Others available. Add $2.50 Shipping.

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WOODWORKER I - For TABLE and RADIAL SAW

this trim and crosscut ALL PURPOSE blade gives scratch free POLISHED cuts on all materials RIP or CROSSCUT up to 2".
- All 60T and 3/32" *THIN* kerf 30° ATB and 5° face hook on 10" dia and under. 12" and 14" are 20° ATB 1/8" K.
- DOUBLE HARDER and 40% STRONGER carbide.
- THIN KERF:
  Saves 1/3 wood loss on each cut, radial or table. Feeds easy when used for moderate rip and crosscut on table saw. **Reduces "JUMP IN"** greatly for better "PULL CONTROL". Practically **eliminates bottom splinter** on RADIAL-CROSS CUT.
- Totally stops ALL bottom and top splinter on ply veneers in push-cut mode on RADIAL.
- Our STIFFENER STRONGLY RECOMMENDED AGAINST outside of blade only for best cuts.

Made and serviced in USA for your benefit.

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12" x 60T x 1" or 5/8" 1/8" K	198	139
10" x 60T x 5/8" 3/32" K	162	129
9" x 60T x 5/8" 3/32" K	156	119
8" x 60T x 5/8" 3/32" K	150	109
New 8-1/4" x 60T x 5/8" 3/32" K	150	109
New 7-1/4" x 60T x 5/8" 3/32" K	150	109

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OUT PERFORMS 29 + 32 OTHER DADO SETS-WOOD Mag., Oct. 91, pg. 62,63 "Best Value"

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"No tearout on all five woods tested." -*Fine Woodworking July/Aug, 1991*

NEW 6" D. 5/8" Bore • List $299/**SALE $269** • 10" D. 5/8" & 1" Bore • List $389/**SALE $349**
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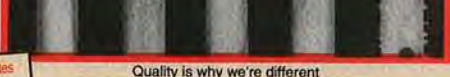

DURALINE Hi-AT For TABLE & RADIAL SAW

(very good on chop saw too!) STOP SPLINTERING those SPLINTERY OAKS, HARDWOOD VENEERS and *thin* 2 SIDE LAMINATES ON PARTICLE BOARD.
FOR FASTER FEED RATES AND MORE ABSOLUTE SPLINTER CONTROL.

DURALINE Hi-AT

Note: *Fine Woodworking Editorial Nov./Dec. 1988 No. 73, pg. 65, S.N. recommends high alternating top bevel (ATB) thin kerfs and large blade stiffeners for smoothest cuts on RADIAL SAW. etc.*

Jim Forrest, President and designer microscoping cutting edge.

All 5/8" holes. Boring up to 1-1/4" $7.50 extra
Larger holes - time basis. Shipping $4.50

	List	SALE
7-1/4" x 60T 3/32"	$149	$129
8" x 80T 1/8" & 3/32"	202	$169
9" x 80T 1/8" & 3/32"	207	$179
10" x 80T 1/8" & 3/32"	207	$159
SPECIAL SALE10" ONLY $159		
12" x 80T x 1" 1/8"	212	$181
12" x 100T x 1" 1/8"	253	$215
14" x 80T x 1"	232	$197
14" x 100T x 1"	266	$226
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16" x 100T x 1"	294	$243

CARBIDE IS THE HARDEST OF THE C-4 GRADES AND 40% STRONGER. NOT WEAKER!! For 50% to 300% longer life!

FACT: Duraline Hi-AT with dampener/stiffener is the quietest blade on the market!

You've probably read the recent articles on the new "quiet" blades. But the fact of the matter is a Forrest 80 tooth Duraline Hi-AT with blade stiffener cuts 50% quieter than those so-called "quiet" blades.

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WOODWORKER'S RESOURCE

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WOODWORKER'S RESOURCE

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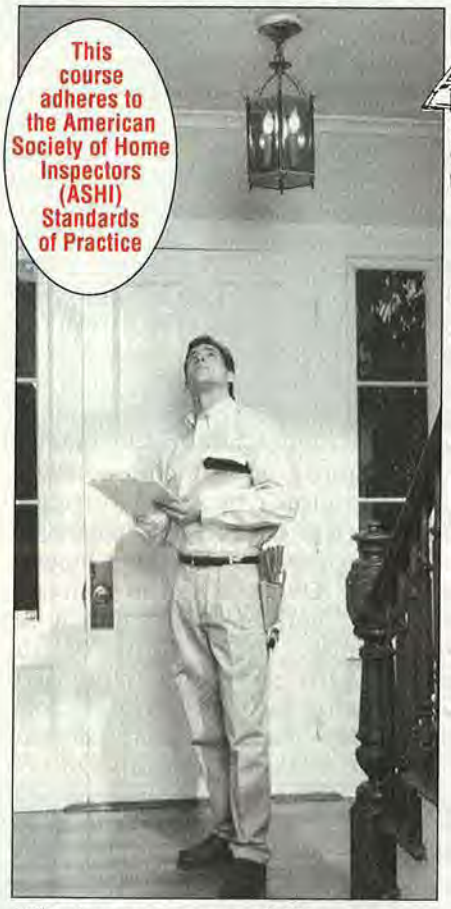

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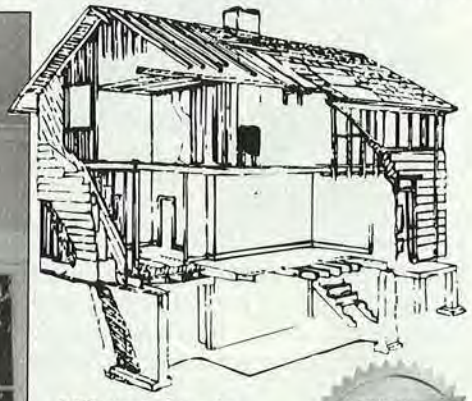

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Stanley brings back its English-made hand planes

Most of the garden-variety hand planes sold in homecenters and hardware stores aren't built well and will frustrate the unwary woodworker. So I was pleased to see Stanley Tools bring back the Stanley Bailey line of planes made in Sheffield, England.

I tried two of these planes, a 22" jointer (Stanley Bailey #7) and a 14" jack plane (Stanley Bailey #5). Both feature cast-iron bodies, brass adjustment knobs, and chrome-plated frogs and lever caps. I found that the soles are ground reasonably flat, the chip breaker fits snugly on the blade, and the blade-depth adjustments prove easy and accurate.

The one complaint I have is the use of plastic handles and knobs. The knobs make no difference in the performance of the plane, but I think most woodworkers would prefer hardwood.

As far as tune-ups go, all I had to do was sharpen the blade and do some minor flattening on the soles. At 3⁄32"-thick, the blades are not as massive as some you'll find on more-expensive planes. But they sharpen well, hold up to hard use, and cut wood just fine.

—Tested by Matt Ver Steeg

Stanley Bailey #7 plane, about $110, Stanley Bailey #5 plane, about $70 at hardware stores. For information write to Stanley Tools, 600 Myrtle St., New Britain, CT 06050. To order call 800/249-8665.

Get lots of bang for your bucks with this tablesaw

Many 3-hp enclosed-cabinet tablesaws cost well over $1,000. Enlon's Taiwan-made entry in this field, model EN3202, gives you all the desirable features of this heavy-duty type of saw, and an attractive price to boot.

The EN3202 comes with a 15-amp, 220-volt, single-phase induction motor that drives the arbor via a triple-V belt. The cast-iron table with solid, cast-iron extensions measures 36×27". For tilt-and-elevation control, a cast-iron trunnion and a large worm gear made cranking the handwheels easy and quick. All my measurements—table flatness, blade-to-miter-slot alignment, arbor runout, and the accuracy of the stops—proved to be excellent.

The motor provides sufficient power to cut through hardwoods as thick as 1½-2" without bogging down. Depth of cut measures 3" at 90°, and 2⅛" at 45°. And at 425 pounds, the weight of the machine soaks up what little vibration the motor creates.

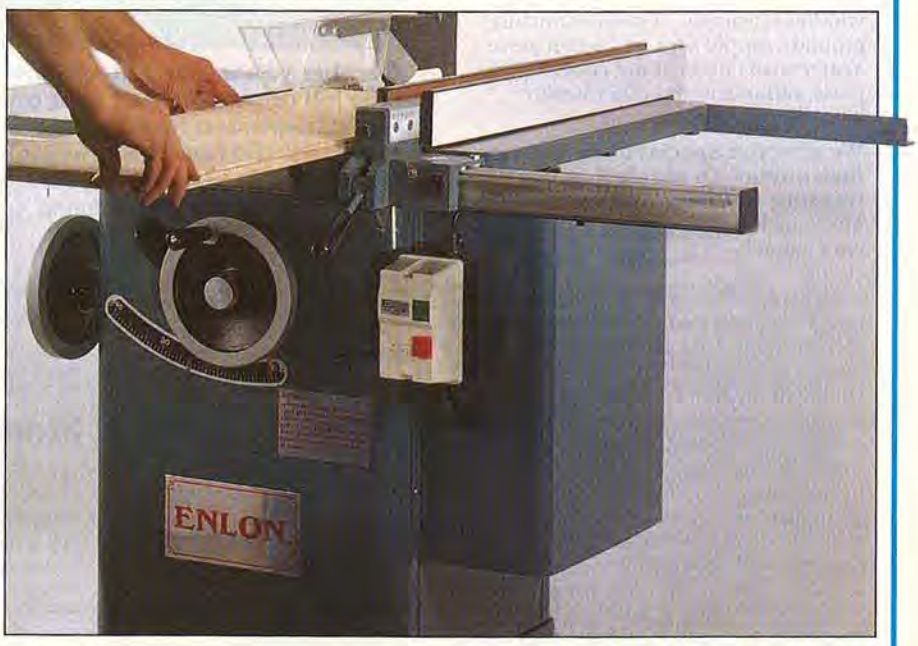
I also was impressed by the fence system. The front rail consists of a square steel tube ground on all four sides. The head of the fence bar rides on this rail via nylon rollers for smooth operation. A lever mechanism accurately locks the fence bar on the front and back rails.

As far as accessories go, the saw comes with a dado insert and a T-slot type miter gauge. Optional accessorices include a mobile base ($80), and fence-extension rails that give you a 52" rip capacity ($125).

The only thing I didn't like about this saw was cleaning off the Cosmoline. This heavy, grease-like coating shields the machine from rust during shipping, but it took me two hours to clean it all off. Otherwise, the EN3202 gives you a lot of saw for the money. Even with the cost of shipping, which may run up to $100, you still get all the benefits of a heavy-duty tablesaw at a price that's just $300-$400 more than most top-quality contractor-style saws.

—Tested by Bob McFarlin

Enlon model EN3202 tablesaw, $840 plus shipping. Enlon Import Corp., 17709 East Valley Blvd., City of Industry, CA 91744. Call 800/888-9697.



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361	3" X 24" BELT SANDER	182
361K	361 W/10 ASST BELTS & BELT CLEANER	193
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363	4" X 24" BELT SANDER	191
363K	363 W/10 ASST BELTS & BELT CLEANER	204
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411	MITER FOLD LAMINATE TRIMMER	165
447	7 1/4" FRAMERS SAW W/BRAKE 15 AMP	137
505	1/2 SHT FIN SANDER	123
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511	CYLINDRICAL LOCK INSTALLATION KIT	139
550	*NEW POCKET CUTTER*	178
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690K	690 W/CS, EDGE GUIDE, & TEMP GD KIT	179
9690	1 1/2 HP ROUTER W/CASE	144
691	1 1/2 HP "D" HANDLE ROUTER	148
691K	691 W/CASE, EDGE GD & TEMP GD KIT	204
693	PLUNGE BASE ROUTER, 1 1/2 HP	169
695	SHAPER TABLE W/ 1 1/2 HP ROUTER	216
696	SHAPER TABLE	128
743	7 1/4" FRAME SAW, 15 AMPS	128
843	7 1/4" FRAME SAW, 15 AMPS	138
2620	3/8" VSR DRILL, 0-1200 RPM W/CHK	88
2621	3/8" VSR DRILL, 0-1200 RPM, KEYLESS	89
5008	DOVETAIL TEMPLATE	78
5009	MORTISE & TENON JIG	47
5116	OMNI JIG	253
6931	PLUNGE ROUTER BASE	73
7116	*NEW 24" OMNIJIG*	293
7310	LAMINATE TRIMMER, 5.6 AMP	88
7312	OFFSET TRIMMER	127
7319	TILT BASE TRIMMER	99
97335	5" RANDOM ORBIT SANDER, VS W/CSE	132
7335K	7335 W/CS, DUST EX SYS, 100 SHTS PPR	165
97336	6" RANDOM ORBIT SANDER, VS W/CSE	137
7336K	7336 W/CS, DUST EX SYS, 100 SHTS PPR	169
73333	RANDOM ORBIT DUST EXTRACTION	24
7518	3 1/4 HP FIXED BASE ROUTER-5 SPEED	267
7519	3 1/4 HP FIXED BASE ROUTER-1 SP	233
7536	2 1/2 HP FIXED BASE ROUTER	202
7537	2 1/2 HP FIXED BASE "D" HNDL RTR	208
7538	3 1/4 HP PLUNGE ROUTER-1 SPEED	235
7539	3 1/4 HP PLUNGE ROUTER-5 SPEED	269
7549	TOP HANDLE BAYONET SAW	134
7549K	7549 W/CASE & 10 BLADES	152
7649	BARREL GRIP BAYONET SAW	147
7700	*NEW 10" LASERLOC MITER SAW*	338
7800	DRYWALL SANDER	329
7810	POWER TOOL TRIGGERED WET/DRY VAC	252
9118	PORTA PLANE KIT W/CASE, CRBD BLD	209
9314	4 1/2" TRIM SAW KIT	152
9315	7 1/4" BUILDERS SAW KIT	139
9345	SAW BOSS 6" CIRCULAR SAW KIT	123
9347	7 1/4" FRAMERS' SAW W/STEEL CASE	138
9637	TIGER SAW VAR SPD RECIP SAW KIT	144
9647	TIGER CUB RECIP SAW KIT	119
9743	7 1/4" FRAME SAW KIT, 15 AMPS	140
9853S	12V CRDLS KIT W/2 BAT, CASE	169
97310	LAMNT TRIMMR KIT W/4 BASES & CS	194

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1584VS	CLIC BARREL HANDLE JIG SAW, VS	148
1584DVS	BARREL HANDLE JIG SAW, DUSTLS	193
1584VSK	1584VS, CASE, 30 ASSORTED BLADES	188
1587VS	TOP HANDLE JIG SAW, VARSP	148
1587DVS	TOP HANDLE JIG SAW, DUSTLESS	193
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SD508	*NEW 8" SUPER DADO SET*	168

Continued from page 90

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—Tested by Tom Jackson

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Continued on page 94

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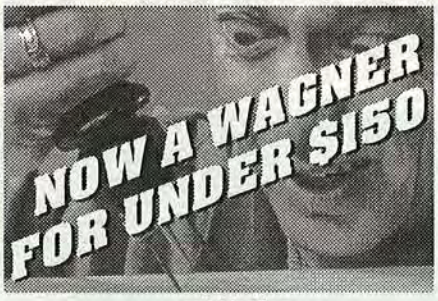

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31-080	1" Belt 5" Disc Sander	93
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31-460	4" Belt 6" Disc Sander	128
32-100	Plate Joiner	258
36-040	8" Compound Miter	154
36-090	Sidekick 10" Miter Saw	218
36-220	10" Compound Miter	228
40-150	15" Scroll Saw	115
40-560	16" Scroll Saw	177
40-640	20" Scroll Saw	294
35-617	10"x50T Carbide Bld	34
35-677	14"x106T Carbide Bld	75

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3612BRA	Plunge Router	167
6095DWE	9v. Cordless-2batt.	137
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VS260	1/2 sheet sander	39

RYOBI

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DS1000	Detail Sander	39
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QS1000	Quick Stand	42
R60K	Trimmer 2 base Special	99
R70K	Trimmer 2base Special	99
RJ100VK	Reciprosaw	99
RS112	Random Orbit Sander	54
RS115K	RO Sander Kit	69
SC162	Scroll Saw	119
SC162VS	VS Scroll Saw	169
TS251	10" Miter Saw	169
TS254	10" Miter Saw	197
TS380	15" Miter Saw	365

AIRY NAIL GUNS

241SK 18 G 3/8-1-1/2"Kit $98

EZ1	shoots pins & staples	98
250SK	18 G 3/4- 2" Kit	164
350K	16G 3/4- 2" Kit	198
565T	1- 2-1/2" Finish Gun	204
626SK	1/4"Crown 1" Stapler Kit	104
8290	6d-16dFrming Nailer	318

Emglo

AIR COMPRESSORS

AM39HC4V	3/4 HP- 2 tank	$ 288
AM78HC2	1 1/2 HP-1 tank	279
AM78HC4V	1 1/2 HP-2 tank	299
	AM78DOLHC4V	
New! Oilless 1 1/2 HP-2 tank		299

7pc Forstner Bit Set
7pc Countersink Set
7pc Bradpoint Set
your choice $17.95

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94-100	5 pc Router Bit Cabinet set	$158
91-100	13 pc 1/2"Shank Bit Set	189
92-100	26 pc 1/4"Shank Bit Set	299
LU85M010	10" 80T Finish	58
LU84M011	10" 60T Combo	39
LM72M010	10" 24T Rip	36
LU85M015	15" 108T Finish	98
LU82M010	10" 60T Chipboard	45
LU89M010	10" 72T Aluminium	57
LU92M010	10" 60T Corian®	58
LU98M010	10" 80T Laminates	66
LU72M010	10" 40T ATB	39
LU87M010	10" 24T Thin Kerf	39
LU73M010	10" 60T Crosscut	44

SMARTLEVEL

SL224	2' economy Level	$ 54
PR24S	2' Pro Level w/case	88
PR48S	4' Pro Level w/case	105

STABILA

LEVELS - Hand holes. Two vertical vials. Two milled faces. Yellow coat.

2464	24" w/ hand hole	$ 39
2469	36" w/ hand hole	42
2467	48" w/ hand hole	49
2501	10" POCKET LEVEL	25
2699	6 ft —3vial	99
2700	6 ft 6" —3vial	115
2701	8 ft —3vial	125
Economy Style 24" 2434		25
Economy Style 48" 2437		39
Economy Style 72" 2411		59

Construction Master III

The world's best feet-inch-metric-fraction calculator. Solves rafters hips, valleys, stairs

$69

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IT'S BACK! IT'S NEW! IT'S MADE IN THE USA!

C8FB2 COMPOUND SLIDE SAW $577

60 Tooth Carbide Blade		39.95
C10FA	10" Miter Saw	269
NR83A	Framing Nailer	393
TR6	Laminate Trimmer	91

DeWALT

DW682K Biscuit Joiner $217

DW106	3/8" Keyless Drill	73
DW610	1-1/2 Hp Router	148
DW704	12" Miter Saw	324
DW705	12" Compound	358

TRUGRIP

Clamp 'n Tool Guide		Back-to-Back Bench Clamp	
50C	$ 29.50	BB50	$ 45.95
36C	26.50	BB36	37.95
24C	22.50	BB18	31.95

SENCO SFN2B

Finish Nail Gun Shoots 1 1/2" to 2 1/2" Finish Nails only $359

Panasonic

EY6100EQK NEW! PREDATOR 12 V CORDLESS DRILL IRONMAN $197

EY6100EQKW PREDATOR IRONMAN w/2 Batteries 224

EY6100CQKW PREDATOR 15MinuteCharge w/2 Batteries 198

EY6100CQKW PREDATOR 1 Hour Charge w/2 Batteries 195

Milwaukee

0229-1	3/8" Keyless Drill	$ 108
0234-1	1/2" Magnum Drill	128
0407-1	Cordless Drill Kit-2batt	172
0564-1	Cordless Drain Cleaner	192
3300-1	Rt Angle Drill	189
5192	Die Grinder	174
5682	2 Hp Router	159
5362-1	1" Hawk Hammer	318
5365-1	1" Hawk Hammer Kit	348
5369-1	3/4" D-handle Falcon Kit	238
5371-1	1/2" Hammer Drill	183
5375-1	1/2" Hammer Drill Kit	178
5392-1	3/8" Hammer Drill	126
6140	4 1/2" Grinder	98
6142	4 1/2" Grinder Kit	123
6175	14" Chop Saw	278
6460	10" Circular Saw	258
6490	10" Miter Saw	259
6491	10" Miter Saw w/80t Blade	288
6492	10" Miter Saw deluxe kit	335
6496	10" Compound Miter	299
6528	VS Super Sawzall	169
6539-1	Inline Screwdriver	74
6546-1	2 spd Inline Screwdriver	81
6767-1	Screwdriver Kit	134
8975	Heat Gun	55
8980	Heat Gun Kit	91
8935	Vaccuum	319

6535 Dual range VS Sawzall $115

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Assorted Grits
10 discs per roll—$1.49 / roll or Your Choice
5" discs 10 rolls/$9.99
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Pockethole maker $ 109

KREG JIG for joining faceframes, butt joints and other pocket hole applications

K2	two hole	109.95
K1	one hole	99.95
Extra bit		15.95
Face Clamp		15.95

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Continued from page 92

Guide improves accuracy and versatility of portable drills

Many woodworkers turn to their drill press when they need to drill straight, accurate holes. But what if you don't own a drill press, or the size or location of the workpiece rules out using one?

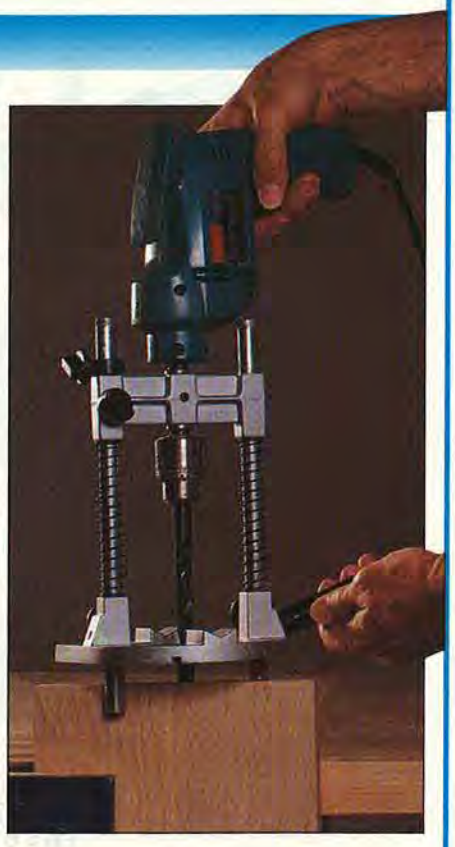
This Wolfcraft Drill Guide provides the answer. To use it, remove the chuck from your drill and screw the shaft of your drill onto the top of the horizontal adapter bar. Then re-mount your chuck on the drill guide's shaft. (You'll need a drill with a ⅜"×24 threads-per-inch shaft.) Slide the base, springs, and the adapter bar onto the guide rods, and you're ready to drill holes.

The guide rods penetrate through the base, and this enables you to set the base at an angle for slanted drilling. You also can use the rods as a centering device for drilling into edges or end grain, as shown in the photo *right*. A depth stop on the guide rods enables you to control how deep you drill, and springs ensure that the horizontal bar returns to the upright position. Maximum travel on the rods measures 7".

The base contains a built-in V-block for holding round stock up to 1½" in diameter. For larger pieces you can center the drill bit using the guide rods. If you are drilling into a door or other vertical workpiece, the base also offers enough flat surface area to secure the drill guide with clamps.

—Tested by Dave Henderson

Wolfcraft Drill Guide, model 4525, about $34. Available in hardware and homecenter stores, or contact Wolfcraft Inc., 1222 West Ardmore Ave., Itasca, IL 60143. Call 708/773-4777.



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Circle No. 78

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DELTA TOOLS

Model	Description	List	Sale
23-700	Wet/Dry Grinder	234	155
23-680	6" Bench Grinder 1/4 HP	86	75
11-950	8" Drill Press	199	135
31-050	1" Belt sander 2.0 amp	104	75
31-460	4" Belt/Disc Sander	198	129
31-340	1" Belt/8" Disc Sander	268	204
40-560	16" 2 speed Scroll Saw	266	178
11-990	12" Bench Drill Press	276	195
11-090	32" Radial Bench Drill Press	399	305
43-505	1/2" Bench Router/Shaper	399	285
22-540	12" Bench Top Planer	Sale	389
36-220	10" Compound Mitre Saw	350	229
28-180	Bench Band Saw	232	158
28-190	NEW 12" Band Saw	465	389
40-640	20" Bench Scroll Saw	466	295
37-070	NEW 6" v/spd Bench Jointer	337	249
14-650	Hollow Chisel Mortiser	668	279
46-700	12" Wood Lathe	548	438
33-990	10" Radial Arm Saw	818	645
37-280	6" Motorized Jointer	488	389
50-179	3/4 HP 2 stage Dust Collector	483	345
33-055	8-1/4" Sawbuck comp w/legs	865	615
34-330	8-1/4" Table Saw 13 amp	343	245
32-100	Stationary Plate Jointer	645	255
36-040	8-1/4" Compound Mitre Saw	224	149
34-915	30" Unifence	385	229
34-897	50" Delta Unifence	525	289
36-755	10" Tilt Arbor Saw	1264	969
34-444	Contractors Table Saw	812	619
17-900	16-1/2" Floor Drill Press	462	399
33-060	"Sidekick" Miter Saw	510	375
37-190	NEW 6" Deluxe Jointer	554	479
36-275	NEW 8-1/4" Builders Saw	444	265
36-210	NEW 10" Compound Mitre Saw	438	255
36-070	NEW 10" Mitre Saw	284	169
36-630	NEW 10" Contractors Saw II	700	575
34-555	NEW Sliding Table	459	359

The following Delta Tools have Rebates ! Rebates end 3/31/95.

$50 Rebate

28-283	14" Band Saw w/enc. stand	910	745
28-283K	28-283 Saw w/28-843 rip fence	Sale	789
34-445	34-444 Saw w/30" Unifence	1200	775
34-445K	34-445 Saw w/34-914 table board		809

$75 Rebate

22-661	13" Planer w/ 2HP motor	1513	1189
37-154	DJ15 6"Jointer w/3/4HP motor	1451	1185

MILWAUKEE TOOLS

6527	NEW Sawzall with case	320	172
6528	above Sawzall w/wired cord	316	172
0407-1	12V Drill w/kyls chuck & 2 batt	172	
0406-1	9.6V Drill Kit with 2 batteries	332	159
0224-1	3/8" Drill 4.5 amp magnum	227	124
0234-1	1/2" Drill 4.5A mag 0-850 rpm	237	128
0244-1	1/2" Drill 4.5A mag 0-600 rpm	237	128
0222-1	3/8" Drill 3.5 amp 0-1000 rpm	198	109
0228-1	3/8" Drill 3.5 amp 0-1000 rpm	195	109
0375-1	3/8" close quarter Drill	237	135
0379-1	1/2" close quarter Drill	268	155
6546-1	cdls Scrwdvr 200 & 400 rpm	141	84
5399	1/2" D-hdle Hammer Drill Kit	332	194
6507	Original SawZall with case	264	144
8977	Variable temp. Heat Gun	131	79
5397-1	3.8" var. spd Hammer Drill Kit	255	142
5371-1	1/2" var. spd Hammer Drill Kit	340	186
3107-1	1/2" v/spd right angle Drill Kit	399	219
6754-1	Drywall Gun 0-4000 5.4 amp	196	114
3300-1	1/2" var. spd right angle Drill	356	194
5680	Router 2 HP - 12 amp	362	195
0235-1	1/2" Drill w/keyless chuck	237	128
6142	4-1/2" Grinder w/cse & access.	208	124
6749-1	Drywall Gun 0-2500 5.4 amp	218	128
6365	7-1/4" Circular Saw 13 amp	218	122
6366	6365 w/fence & carbide blade	228	129
6368	6365 w/fence,carb. blde,& cse	249	139
6377	7-1/4" Worm Drive Saw	330	189
6256	Top Handle Jig Saw	264	148
6490	10" Mitre Saw	444	255
6491	6490 w/ carbide blade & bag	532	275
6494	NEW 10" Compound Mitre Saw	444	309

FREUD CARBIDE TIPPED SAW BLADES

5/8" Bore - Industrial Grade

Item	Description	Teeth	List	Sale
LU72M010	Gen Pur. A.T.B.	10" 40	69	39
LU82M010	Cut-off 10"	60	93	49
LU84M011	Comb 10"	50	78	42
LU85M010	Super Cut-off	10" 80	115	59
LM72M010	Ripping 10"	24	69	38
LU73M010	Cut off 10"	60	84	45
LU87M010	Thin Kerf 10"	24	72	39
LU88M010	Thin Kerf 10"	60	88	45
LU98M010	Ultimate 10"	80	128	68
LU91M010	Compnd Mitre 10"	60	88	54
F410	NEW Quiet Blade 10"	40	95	49
F810	NEW Quiet Blade 10"	80	135	74
TK303	7-1/4" Finishing	40	38	22
TK906	10" Combo	50	53	29
SD308	8" Dado - Carbide		230	119
SD506	6" carbide w/case & shims		292	155
SD508	8" carbide w/case & shims		344	168
F0	1-3/4" x 5/8" Biscuit 1000 Qty		43	29
F10	2-1/8" x 3/4" Biscuit 1000 Qty		43	29
F20	2-3/4" x 1" Biscuit 1000 Qty		45	29
FA	Assorted Biscuits 1000 Qty		45	29
FB100	16 piece Forstner Bit Set		338	189
94-100	5 pc. Router Bit Door System		320	159
TR215	NEW 10" Slide Cmpd Mitre Saw		688	369
JS102	NEW Biscuit Jointer w/adj.fnc&cs		355	179

These Freud Tools have a $30.00 Rebate thru 3/31/95 ! Price shown is before rebate.

FT2000E	3-1/4 HP v/sp Plunge Router	410	205
JS100	Biscuit Jointer with case	334	164

MAKITA TOOLS

Model	Description	List	Sale
6070DW	3/8" v/spd Reverse Drill 7.2V	128	64
6172DWE	3/8" v/spd Drill Kit w/ 2 batt	220	109
5090DW	3-3/8" Saw Kit 9.6 volt	270	145
ML900	Incandescent Flashlight 9.6V	Sale	37
DA391DW	3/8" angle Drill Kit 9.6 volt	312	179
6012HDWE	2 speed Drill Kit w/2 batt.	243	135
6093DWE	6093DW Drill Kit w/2 batteries	270	139
6095DWE	6095DW Drill Kit w/2 batteries	270	139
6201DWE	NEW 9.6V Drill Kit w/2 batt.	298	155
6211DWE	12V Drill Kit with 2 batteries	330	165
632007-4	9.6 volt Battery	47	30
632002-4	7.2 volt Battery	39	28
5007NBA	7-1/4" Saw w/electric brake	263	135
5008NBA	8-1/4" Saw w/electric brake	346	195
B04510	1/4 sheet Pad Sander	106	59
9900B	3" x 21" Belt Sander w/bag	344	175
9924DB	3" x 24" Belt Sander w/bag	329	184
4301BV	Orb. var. spd Jig Saw 3.5A	292	158
JR3000V	var. speed Recip Saw w/case	252	135
9820-2	Blade Sharpener	394	205
N1900B	3-1/4" Planer with case	244	129
N9514B	4" Disc Grinder 4.6 amp	111	65
B04550	1/4 sheet Pad Sander w/bag	98	52
DA3000R	3/8" Angle Drill	314	179
2708W	8-1/4" Table Saw	585	298
2711	10" Table Saw with brake	1067	565
6404	3/8" Drill Rev. 0-2100 rpm	112	58
6510LVR	3/8" Drill Rev. 0-1050 rpm	168	98
6013BR	1/2" Drill Rev. 6 amp	280	149
9401	4" x 24" Belt Sander w/bag	378	229
4302C	var. speed Orbital Jig Saw	351	199
5077B	7-1/4" Hypoid Saw	281	155
5007NB	7-1/4" Circular Saw 13 amp	232	124
5007NBK	5007NB Saw w/ plastic case	Sale	129
LS1011	**10" Slide Compound Saw**	946	509
LS1211	New 12" Slide Cmpd Saw	1550	865

SIOUX TOOLS

8030	New 3/8" var/spd Drill	250	145
8000	3/8" var/spd close qtr Drill	201	125
690	5" Air Random Orbit Sander	139	132

SENCO AIR NAILERS

SFN1	Finishing Nailer 1" - 2"	448	298
SN325	Nailer 1-7/8" - 3-1/4"	665	419
SLP20	New Pinner w/cse 5/8 -1-5/8"	399	269
SKS	Stapler 5/8" - 1-1/2"	390	269
SN70	Fram. Nailer Clip Hd 2"-3-1/2"	690	475
SN60	Fram. Nailer-Full Hd 2"-3-1/2"	638	445
SFN40	NEW Finish Nailer 1-1/4 - 2-1/2"	571	385

BOSTITCH AIR NAILERS

N80S-1	Stick Nailer	Super Sale	348
RN45	Coil Roof Nailer 3/4 - 1-3/4	845	409
N60FN-2	Finishing Nailer	650	335
BT35-2	Brad Tacker 5/8" - 1-3/8"	275	165
BT35-2K	BT35-2 w/ case, oil, & brads	299	179
CWC100	1 HP Pancake Compressor	463	289

SKIL SIZZLERS

77	7-1/4" Worm Drive Saw	257	144
77M	NEW 77 Mag Worm Saw	300	164
2735-04	12 volt cordless Drill Kit	249	144
2736-04	2735-04 with keyless chuck	269	145
1605-02	Biscuit Joiner w/case	221	129
3400	10" Table Saw - Bench Top	270	178

PANASONIC CORDLESS

EY6205EQK Same as EY6205BC but comes with **Ironman** battery 368 192

EY6207BC NEW 12 volt 1/2" Drill w/keyless chuck var. speed w/15 min. charger & case 420 222

EY6282EQK Var. spd 9.6 volt Drill with 15 min. charger, case & NEW **Ironman** battery 315 169

EY62821DKW 9.6 volt Drill Kit w/2 batt. 395 162

NEW PREDATOR DRILLS

EY6181CRKW NEW 9.6V Compact Drill Kit w/2 batt - 10% more pwr than EY62821DKW 305 158

EY6100CRKW NEW 12 volt Drill Kit with 2 batteries, 1 hour charger, & case 358 185

EY6100CQKW Same as **EY6100CRKW** but has 15 minute charger 420 198

EY6100EQK NEW 12 volt Drill kit with NEW **Ironman** battery, 15 min. charger, & cse 375 199

EY6100EQKW Same as **EY6100EQK** but w/2 **Ironman** batteries... 473 225

PASLODE IMPULSE GUNS

IM250	Trimpulse Finish Nailer Kit	849	565
IM325	Impulse Framing Nailer Kit	849	565

WAGNER PAINT & SPRAYER PRODUCTS

230HD	Power Painter/Sprayer	100	89
255	Airless Kit	180	135
375E	Airless System	195	159
505	High performance Airless Painter	440	369
HVLP	Fine coat finishing HVLP System	195	155
CS2000	Pro fine finish HVLP System	339	278

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0241SK
Brad Nailer 3/8"-1 9/16"
Same as Senco SLP-20
List 180 Sale 98

0250SK
Brad Nailer 3/4"-2"
List 296 Sale 164

0626SK
1/4" Crown Stapler 3/8"-1"
List 194 Sale 104

0635SK
1/4" Crown Stapler 1/2"-1-3/8"
Same as Senco SKS
List 310 Sale 175

EZ-1
New Multi-purpose nailer & stapler
List 180 Sale 99

Above Nailers come w/case, fasteners, oil & wrenches

0565T
Angle Finish Nailer 1"-2-1/2"
List 386 Sale 205

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DEWALT TOOLS

Model	Description	List	Sale
DW364	7-1/4" Circ. Saw w/brake	285	154
DW945K-2	12V cdls Drill Kit w/2 batt	309	169
DW944K-2	9.6V cdls Drill Kit w/2 batt	283	165
DW610	1-1/2 HP 2 handle Router	274	149
DW411	1/4 sheet Palm Sander	97	58
DW100	3/8" Drill, 4 amp,0-2500 rpm	118	68
DW682K	**Biscuit Joiner with case**	429	219
DW705	12" Compound Mitre Saw	706	359
DW615	1-1/4 HP Elec. Plge Router	290	158
DW625	3 HP var. spd Plunge Router		269

DW625 Router comes with FREE DW6966 Fine Depth Adjuster.

DW675K	3-1/8" Planer with case	289	164
DW431	3 x 21 v/spd Belt Sander	331	179
DW444	6" Ran Orb Sander-PSA pad	266	149
DW443	DW444 w/hook & loop pad	266	149

NEW DEWALT CORDLESS DRILLS

DW952K	3/8" v/spd w/one 9.6V batt	280	159
DW953K	3/8" v/spd w/one 12V batt	306	175
DW962K-2	3/8"v/sp w/two 9.6V XR batt	324	179
DW972K-2	3/8"v/sp w/two 12V XR batt	352	189
DW991K	3/8"v/sp w/one 14.4V XR batt	370	199

Above drill kits come w/ charger & steel case!

PORTA NAILER

401	Porta Nailer complete	265	205
501	Face Nailer complete	265	205

WERNER LADDERS

6205	5' Fiberglass	199	75
6206	6' Fiberglass	225	86.95

HITACHI TOOLS

C8FB	8-1/2" Slide Compound Saw	1400	575
P12R	12-9/32" Planer	1470	789
P12RA	Planer/Joiner	1940	969
G12SA	4-1/2" Grinder 6.9 amp	160	89
NR83A	Fram Nailer 2 - 3-1/2 Full Head	700	395
NR83AA	Framing Nailer 2 - 3-1/2	750	419
NT65A	16 ga. Brad Nailer 1 - 2-1/2	610	335
NV45AB	Coil Roofing Nailer 7/8 - 1-3/4	750	415
NV83A	Coil Nailer 2 - 3-1/4	750	419

BIESEMEYER FENCES

B-50	50" Commer. Saw Fence	345	298
T-SQUARE 52	52" Homeshop Fence	279	238
T-SQUARE 40	40" Homeshop Fence	259	208
T-SQUARE 28	28" Homeshop Fence	249	198

JORGENSEN ADJUSTABLE HANDSCREWS

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#0	8"	4-1/2"	19.76	11.75	58.00
#1	10"	6"	22.63	12.50	68.00
#2	12"	8-1/2"	25.95	14.50	78.00
#3	14"	10"	32.88	18.00	99.00

PONY CLAMP FIXTURES

Model	List	Sale	Lots of 12
50 3/4" Black Pipe Clamps	14.87	7.80	88.95
52 1/2" Black Pipe Clamps	12.40	6.70	71.50

BOSCH

Model	Description	List	Sale
1587VS	NEW Top Hand "CLIC" Jig Saw	292	149
1584VS	NEW Barrel "CLIC" Jig Saw	285	149
Bosch Metal Case for above Jig Saws		34	32
Bosch 30 blade assortment for Jig Saws			28.99

SUPER SPECIAL
1584VS or 1587VS with steel case and 30 Bosch blades ..... **Sale** 189

1942	Heat Gun 600° - 900°	125	78
1272D	3" x 24" Belt Sander with bag	375	204
1273D	4" x 24" Belt Sander with bag	360	215
11212VSR	Bulldog 3/4"SDS Rtry Drill	390	209
1347AK	4-1/2" Grinder w/cs & access.	185	109
1348AE	5" Grinder 8.5 amp	225	129
1194VSR	1/2" var. speed Hammer Drill	282	149
1194VSRK	above Hammer Drill w/case	313	169
1608	5.6 amp Laminate Trimmer	168	95
1609K	Lam Installers Kit with 1609	343	184
1609KX	Deluxe Installers kit	405	228
1604A	1-3/4 HP 2 Handle Router	250	139
1604AK	same as above w/cse & acc	318	185
1606A	1-3/4 HP D-handle Router	295	179
1593	NEW 3-1/4" Planer 6.9 amp	304	179
3270DVS	3 x 21v/spd belt sander w/ bag	270	165
1273DVS	var. spd 4" x 24" Belt Sander	415	225
1614	1HP Plunge Router	245	149
1614EVS	1-1/4HP v/spd Plge Rtr	283	159
1613	1-3/4 HP Plunge Router	316	169
1613EVS	2HP v/sp Plunge Router	359	194
1615	3 HP, Plunge Router	430	245
1615EVS	3 HP v/spd Plge Router	505	278
1632VSRK	Recip Saw 8.4A orb-v/spd	225	154
3050VSRK	9.6V cdls v/sp Drill Kit comp	288	149
3051VSRK	3050VSRK w/keyless chuck	299	149
1370DEVS	6" Random Orbit Sander	427	228
3283DVS	5" Random Orbit Sander	169	98
3283DVSK	3283DVS Kit complete	199	118
B1650K	NEW Biscuit Joiner	289	155
B7000	NEW Corner Detail Sander	122	68
B4050	NEW In Line Jig Saw	199	115

AEG POWER TOOLS

Model	Description	List	Sale
TXE150	6" var/spd Ran Orb Sander	304	139
HBSE75S	3"x21" var/spd Belt Sander	309	178
BSPE100X	Top Handle Jig Saw w/case	286	159
FSPE100X	Barrel Grip Jig Saw w/case	274	159

BLACK & DECKER

1166	3/8" Drill 0-2500 rpm 4 amp	118	65
79-034	Workmate 400	181	109
2694	7-1/4" Super Sawcat w/case	285	158
2695	8-1/4" Super Sawscat w/case	328	175

DAVID WHITE

LP6-20	Sight Level package - 20x	310	195
LP6-20XL	LP6-20 w/9056 tripod & 7620 rod		259
LT8-300	Level Transit - 26x	695	439
LT8-300P	above Level w/optical plum	821	518
LT8-900	Level Transit - 20x	389	239
ALT6-900	Automatic Level - Transit -18x	638	395
ALTP6-900	above Level w/tripod & rod	708	469
ALP6-18HD	above Level w/tripod & rod	570	375
ML100I	NEW Laser Level	1099	945
ML100	NEW Laser Level w/detector	1249	1075

RYOBI SPECIALS

TS-254	10" Mitre Saw	440	209
RE600	3 HP Plunge Router	500	228
BE321	3" x 21" var. spd Belt Sander	310	139
TFD222VRK	12V cordless Drill Kit	365	155
TFF100	Flashlight uses 7.2,9.6,12v battery		9.95
BT3000	10" Table Saw with stand	1125	529
TSS220	8-1/2" Slide Comp. Saw	966	445
DS1000	Detail Sander	90	44
AP12	12" Bench Planer	884	395
BS900	9" Bench Band Saw	340	169
OSS450	Oscillating Spindle Sander	340	159
ML618	NEW Mini Lathe var/spd	418	225
DC500	NEW Detail Carver	120	64

LAMELLO BISCUIT JOINTERS

TOP 10	"Simply the Best"	699	538
STANDARD 10	"Professionals Choice"	499	399

Msx636 FEIN	Triangle Sander Kit	Sale	185
LPN672 PONY	Air Palm Nailer w/glove	Sale	94.99

QUAL-CRAFT PRODUCTS

2200	Pump Jack	79	58
2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	21
2204	Workbench & rail holder combo	53	39

Buy any 6 (can be assort.) deduct 10%

2601	Wall Jack	167	108

Lots of 4 deduct additional 10%

PORTER CABLE

690	1-1/2 HP Router 8 amp	260	138
691	1-1/2 HP Router D-handle	285	155
693	1-1/2 HP Plunge Router Base	320	174
6931	Plunge Router Base	125	77
695	1-1/2 HP Router/Shaper	400	223
696	Heavy Duty Shaper Table	230	129
351	3" x 21" Belt Sander w/o bag	280	154
352	3" x 21" Belt Sander with bag	290	155
352VS	3x21 Belt Sander w/bag v/spd	305	169
360	3" x 24" Belt Sander with bag	365	194
361	3" x 24" Belt Sander w/o bag	345	189
362	4" x 24" Belt Sander with bag	380	205
97751	1/2" v/spd Hammer Drill w/cse	270	155
9118	Porta Plane Kit 7 amp	390	215
505	1/2 sheet Pad Sander	230	128
6611	3/8" var. speed Drill 5.2 amp	220	119
6614	1/2" var. speed Drill 0-750 rpm	230	128
6615	7514 with keyless chuck	230	128
7549	Top handle Jig Saw 4.8 amp	270	135
330	Speed Block Sander 1/4 sheet	110	60
555	Plate Biscuit Jointer with case	320	159
556	555 jointer w/5556 tilt fence	Sale	165
345	6" Saw Boss 9 amp	190	104
9345	345 comp. w/cse & carb blde	220	124
9647	TIGER CUB Recip. Saw	210	119
9637	Full var/spd Recip Saw 8 amp	270	148
7519	3-1/4 HP Router 2 Handle	445	239
7518	3-1/4 HP 5 speed Router	510	268
7538	3-1/4 HP Plunge Router	445	239
7399	5.6 amp Drywall Cutout Unit	140	84
7310	5.6 amp Laminate Trimmer	165	95
97310	Laminate Trimmer Kit comp	360	198
7335	5" var. spd Rndm Orbit Sndr	245	132
7336	6" var. spd Rndm Orbit Sndr	250	137
73333	Dust Collection system	31	24.50
7539	3-1/4HP v/spd Plunge Router	510	269
9853	12V 3/8" Drill w/ keyless chuck	280	154
9855	12V 1/2" 2 spd,v/sp Drill w/cs	335	188
8500	12V battery for above drills	Sale	45
332	Palm Grip Rndm Orbit Sander	120	69
333	above Sander with dust bag	135	75
334	333 Sander with PSA pad	135	74
340	1/4 Sheet Orb Sndr w/dust p/u	89	55
7116	24" Omni Jig	535	294
550	Pocket cutter with case	330	179
7700	10" "Lazerloc" Mitre Saw	634	339

New Tools by Porter Cable

310	Production Laminate Trimmer	250	145
347	7-1/4" "Framers" Circ Saw	225	129
743	347 Saw - left hand version	225	129
9743	NEW 743 Saw with case	255	148
9347	NEW 347 Saw with case	255	148
447	347 Saw with brake	225	134
843	447 Saw-left hand version	245	139
7800	NEW Drywall Sander	585	329

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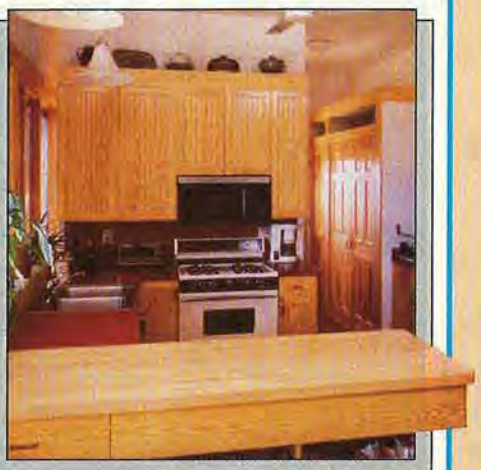
FINISHING TOUCHES

SOUTHERN YELLOW PINE SHAKES STUD ROLE

For more than 50 years, Southern yellow pine (*Pinus palustris*), also called longleaf pine, has met the building industry's demand for house-framing material. You probably know it as wall studs and other 2× lumber. Now, though, the wood has been revived to fill its orginal historic role as well.

Long ago, Southern yellow pine was the most common material for interiors. In the elegant Old South homes of Colonial Williamsburg, Charleston, and Savannah, the wood was used for floors, staircases, sash, doors, and other moldings and millwork.

Today, because of new drying technology that increases its dimensional stability, Southern yellow pine once again fulfills the need for attractive, durable, interior stock. In fact, the wood is even making a mark as cabinet-class wood, according to the Southern Pine Marketing Council.

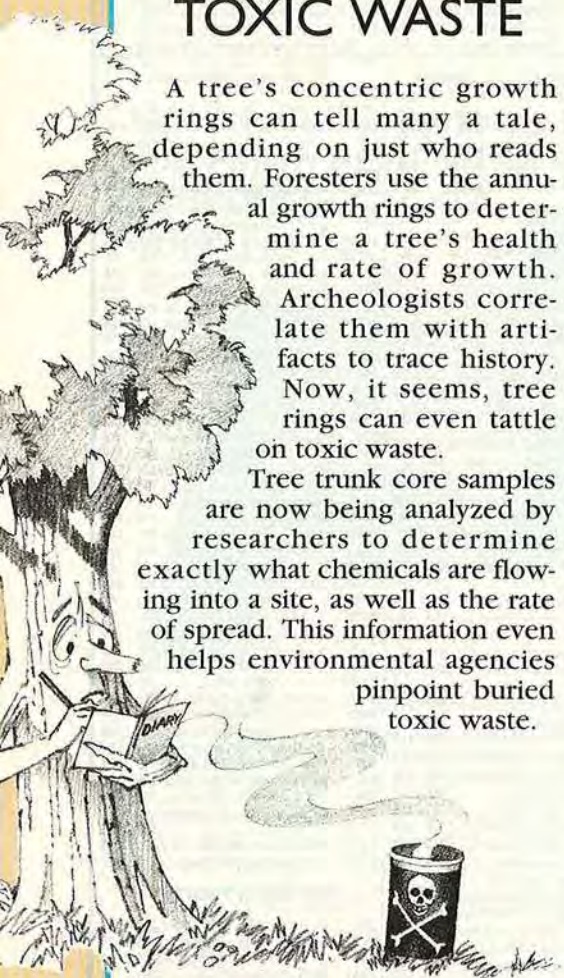


Southern yellow pine's natural golden color and striking grain pattern contribute to the increasingly popular light, all-wood look.

TREE RINGS TATTLE ON TOXIC WASTE

A tree's concentric growth rings can tell many a tale, depending on just who reads them. Foresters use the annual growth rings to determine a tree's health and rate of growth. Archeologists correlate them with artifacts to trace history. Now, it seems, tree rings can even tattle on toxic waste.

Tree trunk core samples are now being analyzed by researchers to determine exactly what chemicals are flowing into a site, as well as the rate of spread. This information even helps environmental agencies pinpoint buried toxic waste.



Up in smoke

A recent study by the Institute for World Economy, based in Kiel, Germany, uncovered some interesting facts about the world's use of tropical wood. Here are the most surprising ones from the research: In 1990, only 12 percent of all the hardwood harvested in the entire world came from rain forests. And of that percentage, 85 percent was burned locally (where it was harvested) as firewood.

CARVER CAUGHT UP IN CLASSICS

Like most of us, Thaddius Maslanka, Sr., 73, discovered Edgar Allen Poe and other classic authors in grammar school. Later, he developed a fascination for the movies. Even later, he found satisfaction in carving. And today, this Chicago artist and carver uniquely blends all three of his loves.

"About 10 years ago, I began incorporating classic-book titles and movies into my carved signs as a tribute to the authors I so enjoyed," explains Thaddius. "My first work was Sherlock Holmes. It was such a satisfaction!" So much so that he went on to do more such work.

Presently, Thaddius' themed signs number more than 50, each devoted to an author, book, or movie title. He's carved and sandblasted Tarzan of the Apes, The Great Gatsby, Moby Dick, The Raven, Beau Geste, and The Last of the Mohicans, to name but a few of them. And he doesn't do his carvings for money.

"I carve them as a wooden legacy to my wife, my son, and my daughter. If I cannot leave them great monetary riches," Thaddius says, "I hope they appreciate this artistic wealth, which remains for all time."

If you want to share ideas or techniques with Thaddius, he asks that you write him at 4608 N. Michigan Ave., Chicago, IL 60630-3036.

Above: **Thaddius Maslanka prefers classic movies for the subjects of some of his carved signs.** ***Below:*** **But he likes book classics, too.**

Photographs: Thaddius Maslanka; Southern Pine Marketing Council Illustrations: Jim Stevenson

IT HAS TWO SPEEDS: FASTER THAN YOU AND MUCH FASTER THAN YOU.

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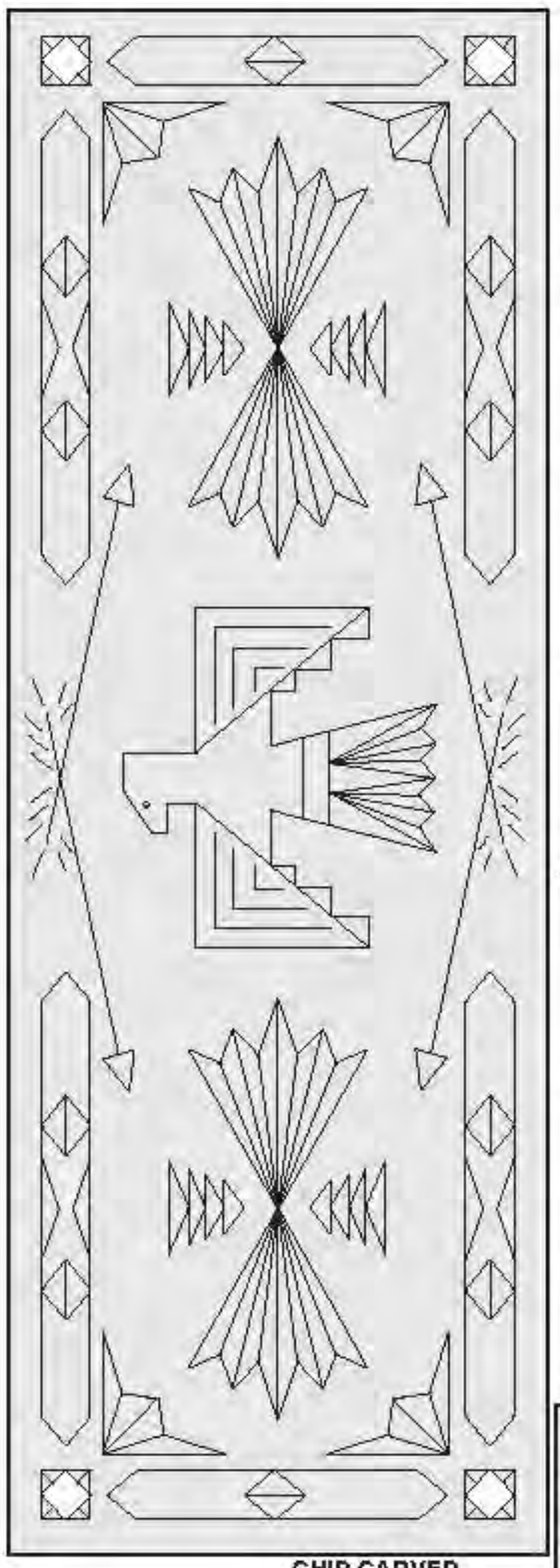

CHIP-CARVED BOX LID PATTERN
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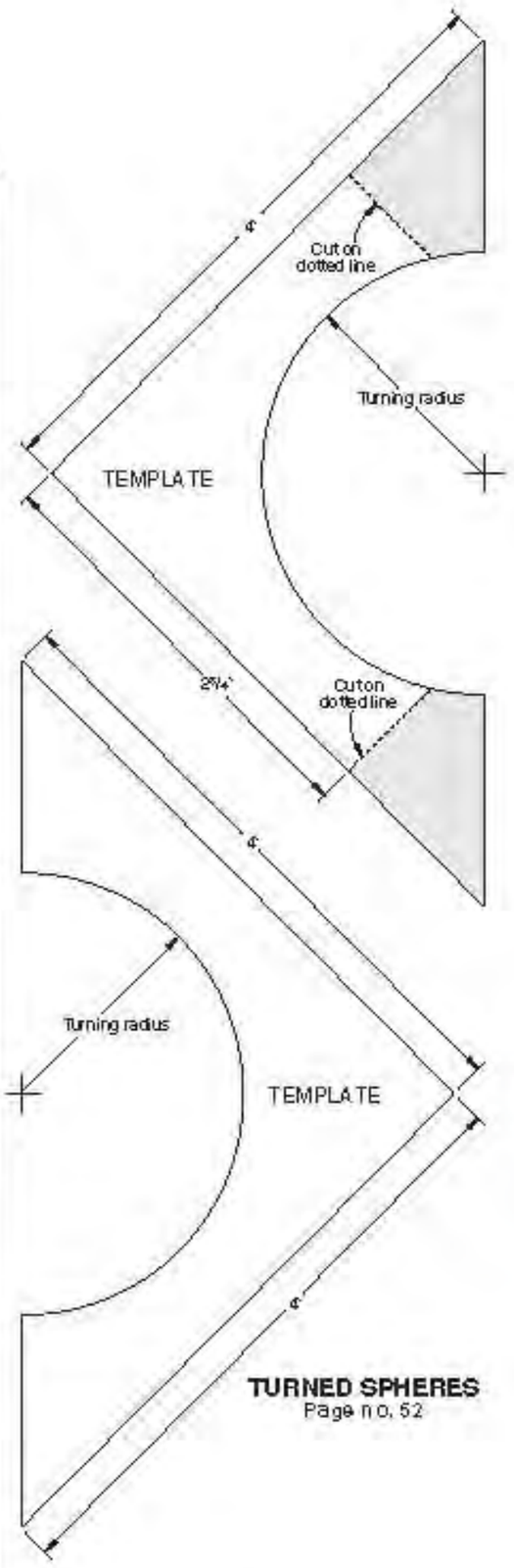

TURNED SPHERES
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Better Homes and Gardens®

WOOD® PATTERNS™

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APRIL 1995 **ISSUE 78**

Dear Reader: As a service to you, we've included full-sized patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Bill of Materials and the drawings accompanying the project you're building.

Page 40

- **Country hall seat**
- **Turned spheres**
- **Federal wall mirror**
- **Kid's dump truck**
- **Chip-carved box**

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Page 63

Page 72

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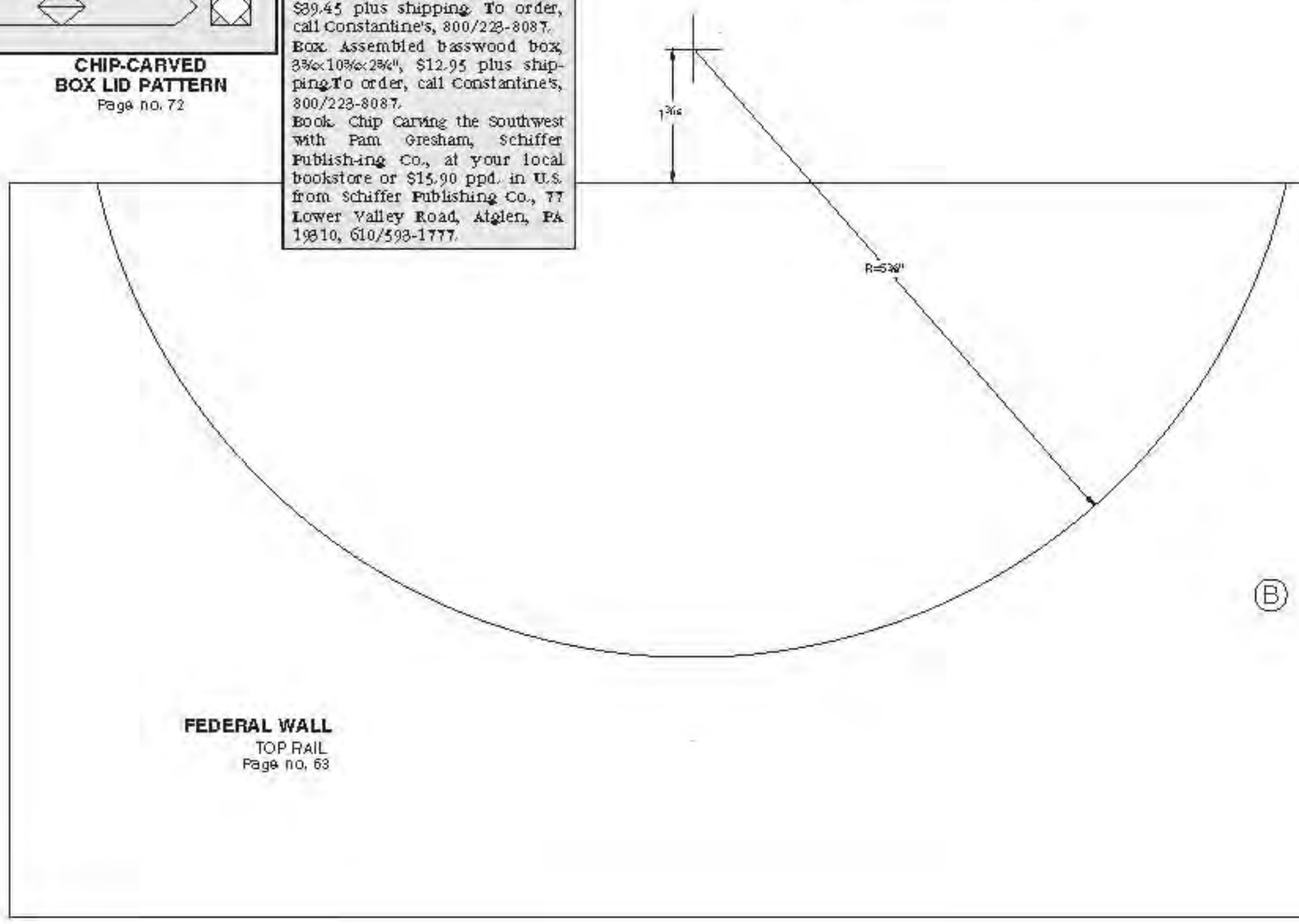
Buying Guide

Carving knives. Wayne Barton chip-carving knife and stab knife. $39.45 plus shipping. To order, call Constantine's, 800/223-8087.

Box. Assembled basswood box, 3⅜×10⅜×2¾", $12.95 plus shipping. To order, call Constantine's, 800/223-8087.

Book. Chip Carving the Southwest with Pam Gresham, Schiffer Publishing Co., at your local bookstore or $15.90 ppd. in U.S. from Schiffer Publishing Co., 77 Lower Valley Road, Atglen, PA 19310, 610/593-1777.

FULL-SIZED PATTERNS



FEDERAL WALL
TOP RAIL
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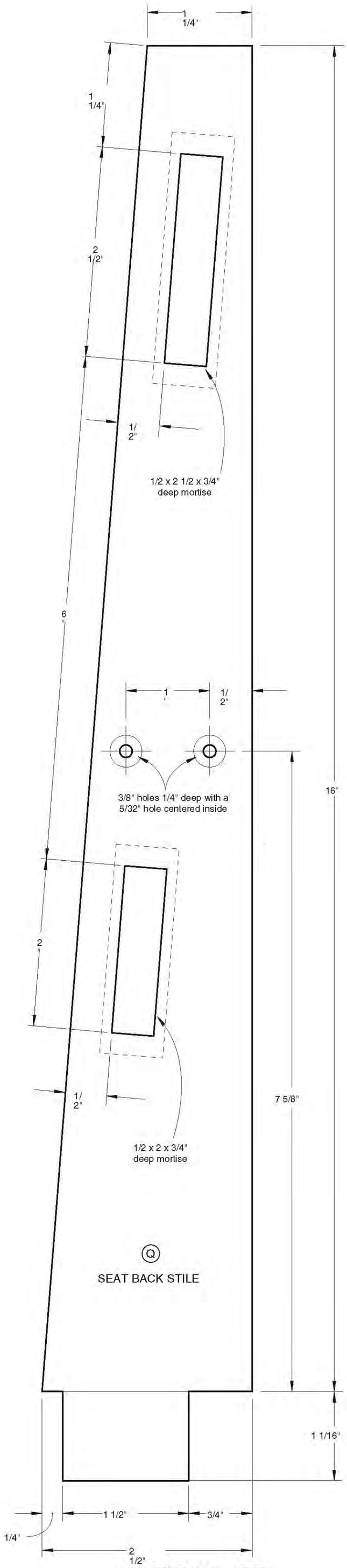
FULL-SIZED PATTERNS



COUNTRY HALL SEAT
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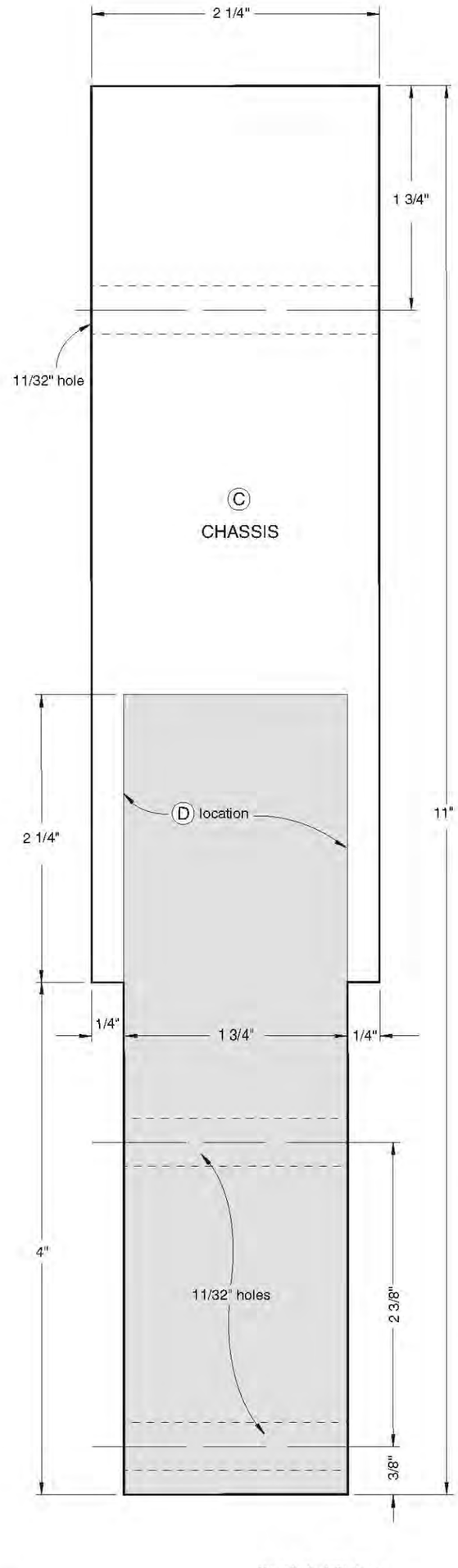

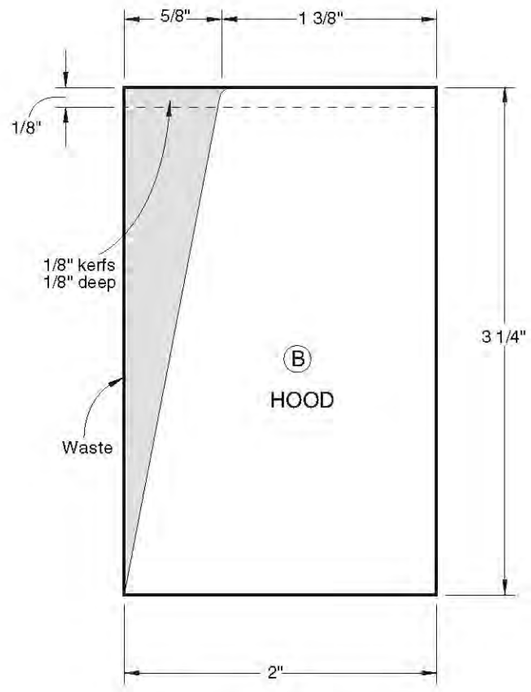

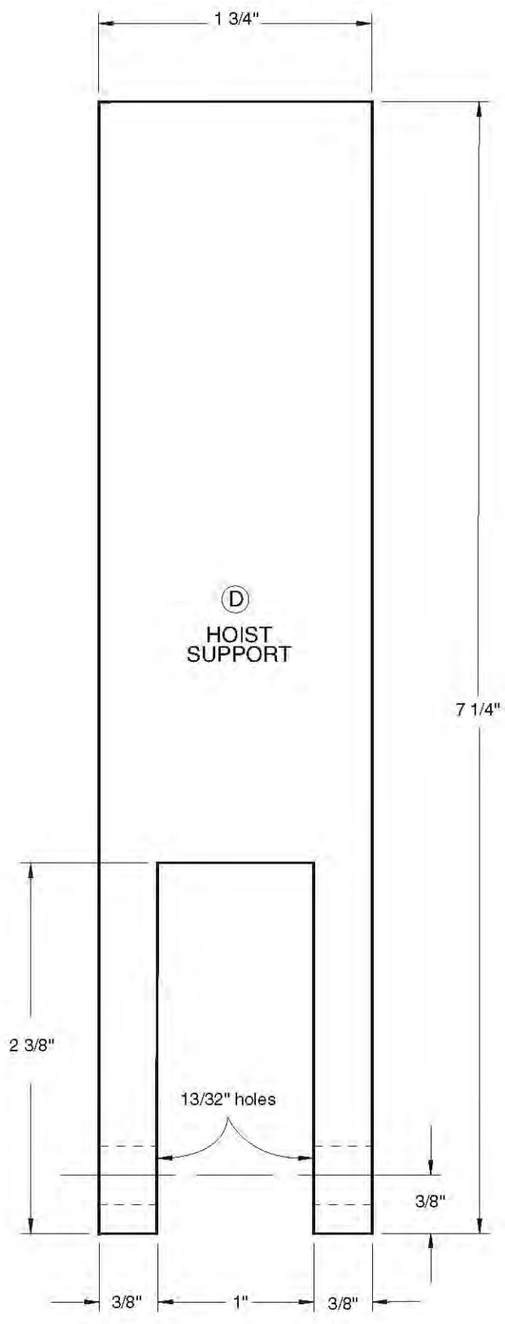

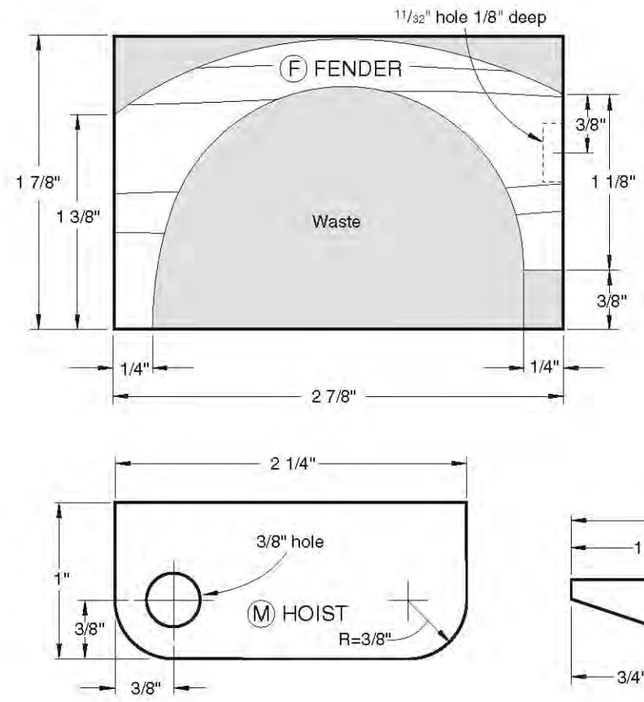

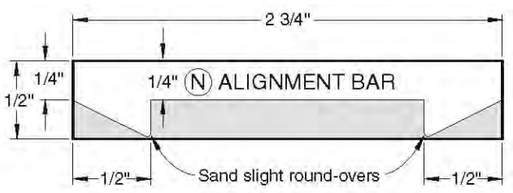

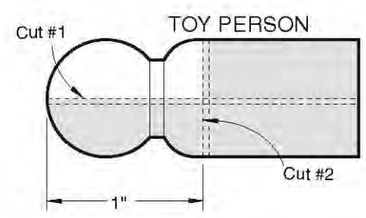

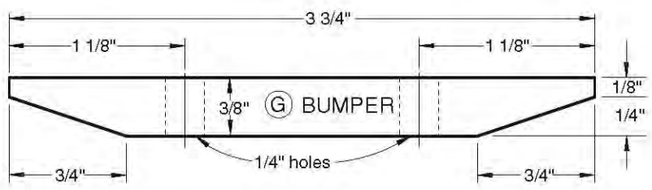

DUMP TRUCK
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